Australian Model Engineering

November-December 2003

Issue 111

$6.50*
(inc. GST)
NZ$9.50*
(inc. GST)

LOCOMOTIVES, TRACTION & STATIONARY ENGINES, GARDEN RAILWAYS, WORKSHOP, PRODUCTS, CLUB NEWS & EVENTS

In This Issue:

- ☑ Make a Nutcracker for Those Christmas Nuts
- ☑ Give Your Bandsaw a Better & More Versatile Table
- ☑ Track Laying Ideas for Garden Railways

ISSN 0819-4734

Print Post Approved Publication No PP228582/00001

*Recommended Retail Price

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AME140903

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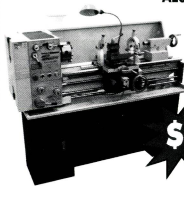

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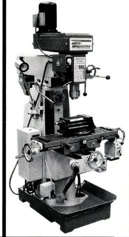

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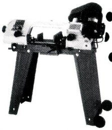

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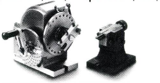

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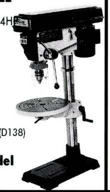

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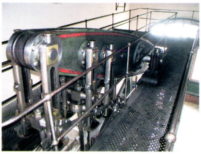
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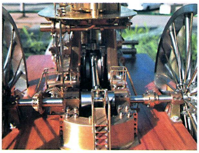
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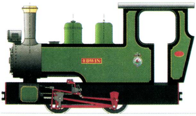

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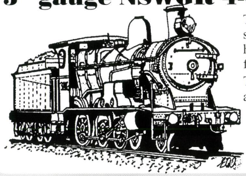
Front cover
Larry Hazell's $7\frac{1}{4}$" gauge Australian National CLP class diesel locomotive towers over Len Whalley's 5" gauge version at the Box Hill track in Victoria. CLP 17 is in the original, as delivered form whereas CLP 8 shows some later detail variations. Photo: Larry Hazell

E. & J. WINTER encore presentation

5" gauge NSWGR 4-6-0 C32 class live steam locomotive



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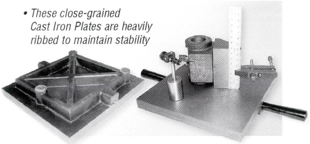

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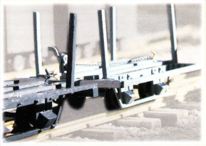

Under development: a Hudswell Clarke 0-6-0 tender locomotive kit, and Malcom Moore locomotive rtr.

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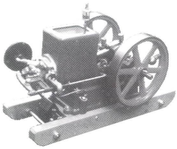

The latest addition to our IC engine range! The prototype model, designed and built by Russell Paynter, was featured in AME issue 50. For a complete change from steam construction, this little unit makes a handy sized portable engine for display or as a self contained power unit. All major parts are of aluminium with cast iron flywheels and gunmetal valve rocker bracket. Ready-cut timing gears can be supplied along with all materials necessary to build the engine.

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Publisher
Australian Model Engineering magazine is published 6 times per year by Australian Model Engineering Pty Ltd. (ACN 008 627 825), at 2-monthly intervals commencing with January.

Subscriptions
An annual subscription to *AME* costs just $38 (incl. GST) within Australia. NZ is AUD$47; all other countries, AUD$58 air. You can pay by cheque, money order, or overseas bank draft, Bankcard, MasterCard or VISA credit card. **All Mail to:**

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Printing
Proudly printed in Australia for the publisher by:
Pirion Printing, 140 Gladstone Street, Fyshwick ACT 2609 Australia

Distribution
Is by subscription, through hobby suppliers and by Gordon and Gotch Limited to newsagents in Australia.

New Zealand agent:
MBM Model Engineering
PO Box 75-153, Manurewa
Ph.: 09-235-2018, fax: 09-235-7537
www.MBMModelEngineering.com

North American agent:
Wise Owl Worldwide Publications
5150 Candlewood Street, Suite 1
Lakewood, CA. 90712-1900
Phone: 562-461-7574; Fax: 562-461-7212
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Deadlines for issue 112

Club Roundup	Nov 7
Letter Box	Nov 7
Classified Ads	Nov 18
Mailout Date	Dec 17

Comment

Peace in our Hobby?

Peace on Earth — are we any closer to it than we were this time last year? I don't believe we are. I am an optimist as I continue to hope commonsense will prevail and that eventually everyone will be able to live without fear or deprivation. Whilst on that line of sentiment, in a far lesser way and on a more local basis, I should also express the wish that commonsense will eventually prevail in our hobby and that as a result everyone will be able to get equal enjoyment from their favourite pastime. That is not the case in Australia at present.

2003 was not model engineering's best year, nor was it the best year for most minature railways. The ongoing dark cloud of insurance hanging over their heads and the ongoing worry of 'going broke' or finding the premium has removed much of the pleasure from the minds of many of our fraternity. An ever increasing number have opted to move into garden railways as a means of escape into a hobby that they can still enjoy, but a lot of those have found another obstacle to block their enjoyment — boilers and the AMBSC!

The AMBSC, which is regarded currently as the authority on miniature boilers, has never really come to grips with the little boilers used by the followers of Gauge 1 and smaller. Some boiler designs and in particular coal-fired ones seem to have gone into the "too hard" basket and others are much smaller than the code covers and therefore public operation of them has become a bit of an unknown. Should the AMBSC codes be revised to include all boilers, down to the very smallest, or would the garden railway people be better off with a special code for really small boilers — a code based on commonsense and practical operation. Do the garden fraternity even want the AMBSC involved? If the AMBSC is to remain relevant to all miniature boilers they need to act quickly and work to accommodate everyone or accept the fact that inevitably another code could become a reality.

If the AALS brokered insurance scheme is to survive then it is a matter of urgency that the organisers either (a) find a more equitable way of spreading the costs, (b) shop around for a better deal, or (c) simply opt for a lesser but more affordable insurance package. We may currently have the best insurance package in the world but that is of little use or consolation if we cannot pay for it!

These thoughts are not intended as doom and gloom, but to provoke discussion which will hopefully may lead to outcomes which benefit us all. In the meantime I wish you and yours a happy and safe Christmas and holiday season.

David

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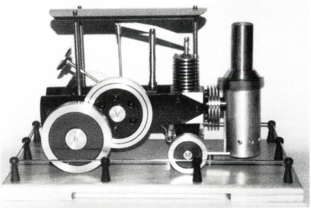
XMAS GIFT IDEA'S From MINI TECH

HOT AIR MODEL TRACTION ENGINE



This model is Edwin's latest and combines the charm of the yesteryear Traction Engine and the technology of the Hot Air Beam Engine, the model is simple to make and will give endless hours of enjoyment to both the observer and the modeler . This kit would be good for the beginner or serious builder, even the experimentalist who loves a fresh idea in powered modeling with no valves, boilers or battery, just light the wick and your away.

The kit comes with materials, plans and construction notes, Pre - cut gears and timber base

all for only **$299.00** inc GST

QUAYLE

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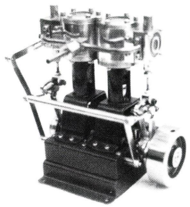

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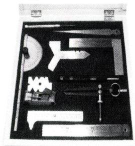

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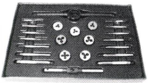

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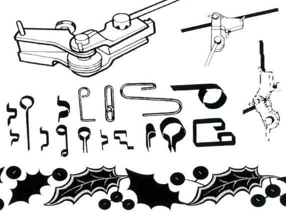

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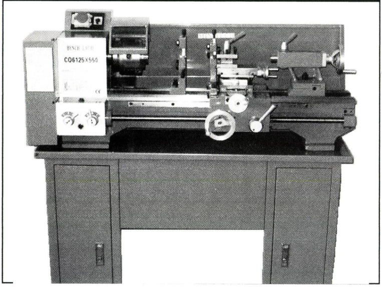

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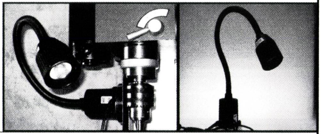

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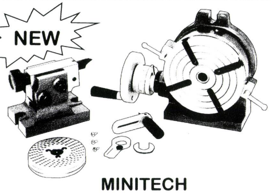

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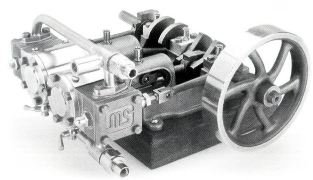

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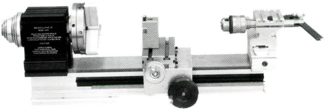

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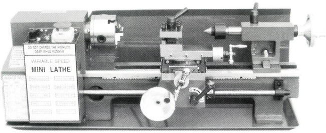

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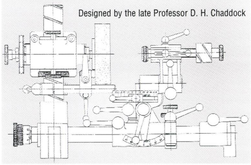

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A Nutcracker for Those Tough Nuts

with some comments on lathe faceplate work

by Jonathon Milne-Fowler

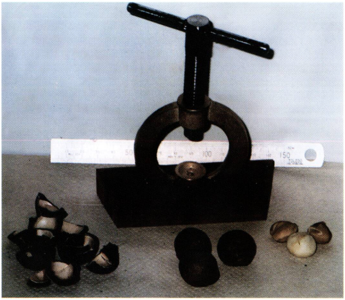
Here is a project which will not take a great length of time to complete and which will make a nice present for the domestic CEO. It is guaranteed to be capable of dealing with the toughest macadamia nuts as well as other less resistant kinds of nuts found in festive season assortments.

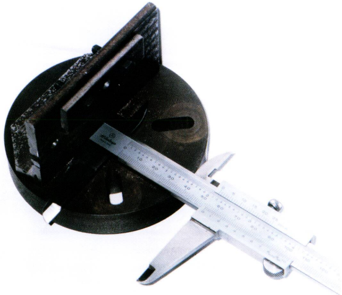
The prototype was made several years ago after a commercially made one, using the same principle, failed due to wear and distortion of the inadequate screw thread with which it was provided. The dimensions shown in the drawing are based on the latest version but are not critical. They may be varied to suit the available materials.

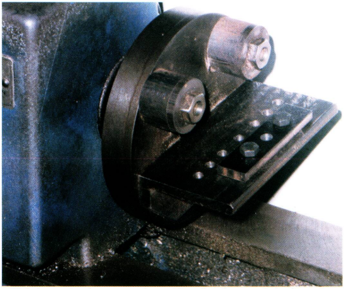
I had on hand several slices of bronze hollow bar and one of these cleaned up to the dimensions shown. I would not recommend anything thinner than 5mm as there is a fair amount of torsional stress developed when the tool is in use.

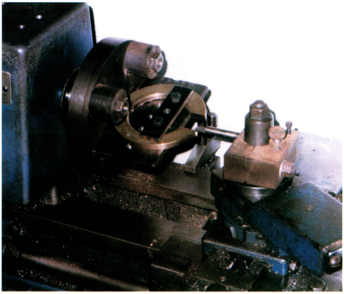
After cleaning up your selected ring it should be set up in the lathe and drilled right across a diameter with whatever small size long series drill you possess. If you are using the usual size of model engineers lathe, the four-jaw chuck will not hold the work piece securely and, for peace of mind and safety, it should be fastened to an angle plate mounted on the lathe faceplate. Now, in all the articles I have read concerning faceplate work I have not come across one which described an easy way to centre the work piece, so what follows may be new to more than one reader.

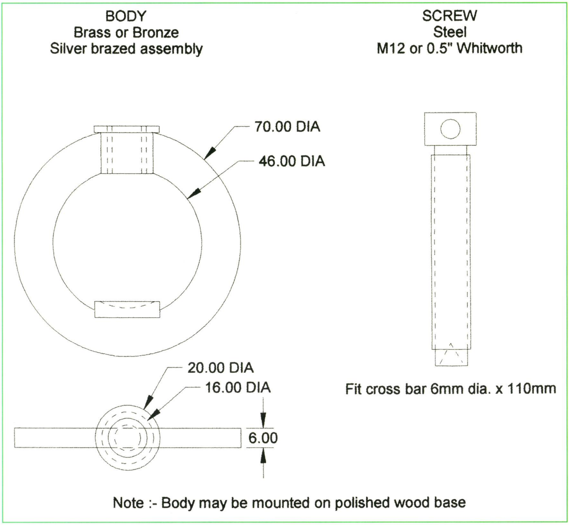
To start with do not try setting the job on the faceplate while it is mounted on the lathe spindle! Take it to the bench and work with the axis vertical. Gravity will help keep things in place while you juggle. Select an angle plate which can be set close to the faceplate centre and which is of a size which will permit the work piece to extend sufficiently past the "right hand" edge while in contact with the faceplate centre bore. The one I used measures


The finished nutcracker just after successfully completing trials


Vernier calipers being used as a setting jig to position the angle-plate on the face-plate


With the angle-plate correctly positioned and secured, the face-plate has been returned to the lathe spindle and balance weights fitted to minimise vibration.

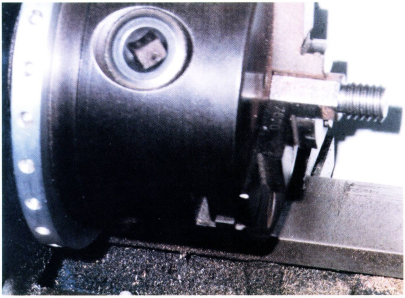

The bronze ring was centred by contact with the centre hole in the face-plate and firmly secured to the angle-plate with the clamping bar. Here the housing for the nut has been bored to size.

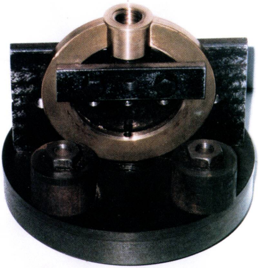


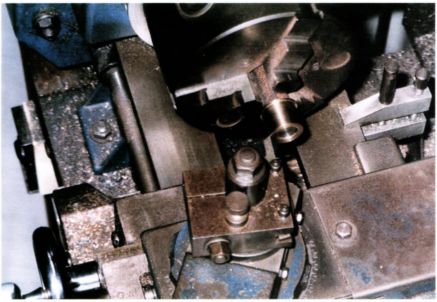
50mm. Using vernier calipers measure the diameter of the faceplate and also the thickness of the work piece. Add these two dimensions together and divide by two to arrive at the dimension to set the vernier and tighten the clamping screw. Now use the vernier as a setting gauge while securing the angle plate. Because the angle plate presents an unbalanced load it will be necessary to fit counterbalance weights so that the lathe will not try to walk across the workshop when you start it running. With the angle plate fixed at the correct distance from the centre the circular work piece will be correctly centred when it is clamped in place while making contact with both edges of the centre bore. Simple isn't it? The next time you need to set a job on the faceplate with an angle plate you will be able to do it with the minimum of fuss.

To return to the nutcracker, the ring needs to be bored radially 16mm to accept the threaded bush and it may then be set aside while the other parts are made. A length of screw rod fitted with a stout tee handle may be used for the screw, but a screw cut in the lathe is to be preferred. M12 has a screw pitch of 1.75mm compared with ½" Whitworth 12 tpi (approx. 2.1mm pitch) and the coarser thread is to be preferred. If you are really keen then 10 tpi Acme thread would be even better for both strength and wear. While set up for screw cutting it will be advisable to make a threaded mandrel which can be used to finish machining the bush. It is quite in order to use a die to remove the last few "thou" and finish the thread form on the screw.

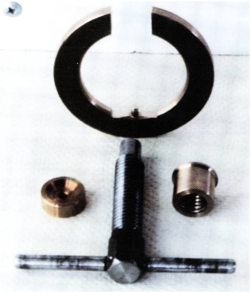
It is possible to make the internal thread in the bush using a screw tap but there is every likelihood that it will not be concentric with the outer diameter. Much better results will be obtained by screw cutting and using the tap only for final sizing. Whichever method you employ it will be best to turn the 16mm reduced outer diameter after the screw thread has been


A mandrel with ½" Whitworth thread was made to take the part made nut for finishing to size.


The nut sitting in its bored housing



The nut being finished to size for a free fit in its housing.



The body components ready for final assembly by silver brazing, together with the completed screw.

completed and this is where the threaded mandrel will be useful. The flange at the top of the bush is helpful in providing positive location when silver brazing the assembly.

As with other components the dimensions of the anvil are not critical but it is desirable for the upper face to be concave and set in line with the axis of the screw. That is why the ring is drilled right across its diameter. The drill hole serves to locate the anvil correctly. The seating for the anvil may be produced with a few judicious strokes of a file preparatory to silver brazing.

A polished wooded base will set off the finished nutcracker, its size and shape is a matter of choice.

My Boat and Boathouse

by Christopher Edwards

The boat was bought at a garage sale as a started kit (Sea Queen) now named *FUKARWEE,* sides and deck not yet fitted. It then spent three years gathering dust in my garage.

When I finally started on it, I got carried away and ended up fitting out with cabins, galley, toilet/shower, bunks, etc. and 21 working lights. A 12 volt gel pack supplies power to the motor, cabin lights, navigation lights and search light — and then through a 6 volt reducer for RX (2 channel) and a 5 volt reducer for deck and masthead lights.

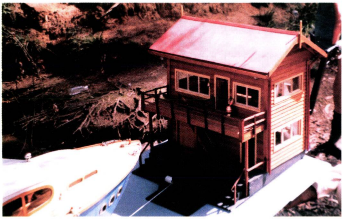
After a number of sailings I decided that although I was handling, carrying and launching 6kg of boat, the next boat would be larger and heavier as well as awkward to handle, having masts, rigging, etc. This started me thinking and after creating some scrap paper I eventually had plans of a slipway to work from.

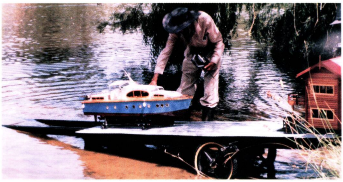
The slipway is in 2 halves, a dry half and a wet half. The wet half fits snugly inside the dry half for transport and extends for launching. There is a telescopic tube inside this structure, operating angle setting arms via a worm screw, while 2 levers lift and lock the dry and wet halves together.

Next came the ways trolley, and here I had a problem — the stern brace beams fouled the hull as the boat left the ways. I solved this by making the stern brace beams lie down when the trolley reached the end of the ways, and stand up as soon as tension is applied to the haul-out cable.

Now I needed a boathouse to complete the scene. The boathouse has a workshop on the ground floor with working vices on workbenches while upstairs is an office with drafting table and manager's desk. There are 11 lights, 2 of which are desk lamps, gutters, down pipes and even a dunny under the stairs.

The haul-out winch was made using a 12 volt car aerial motor and drive gear. The extend/retract winch is a twin drum driven by a 12 volt car window winder.





A Better Table for the Bandsaw

by Peter Dawes

Drawings for publication from the author's originals by Peter O'Loughlin

Summary

The main feature of this new table is that it can be left in place indefinitely unlike the thin pressed metal factory table that has to be removed before the saw can be used horizontally. The second feature is an optional 'ripping' fence – an idea suggested by Greg Bird who found it invaluable when slitting tiny planks for his current project. So this article describes a larger more substantial table with slotted mounting holes. In summary, I have found the new table a marked improvement.

Advantages

(a) To switch between horizontal and vertical operation it is only necessary to loosen the two mounting screws, slide the table backwards or forwards and tighten them again.

(b) Made of 4mm steel plate, it is a much more robust table. There is a nice feeling of rigidity with it, unlike the factory table which could sometimes vibrate.

(c) It is larger than the original – which was only about 7 x 7 inches.

The table can be made even larger than I have specified below, but probably not more than about 12 inches square (300 x 300) in total area on account of the fact that its only support is the blade guide. To add outrigger support defeats the purpose of having it remain in place for both horizontal and vertical sawing.

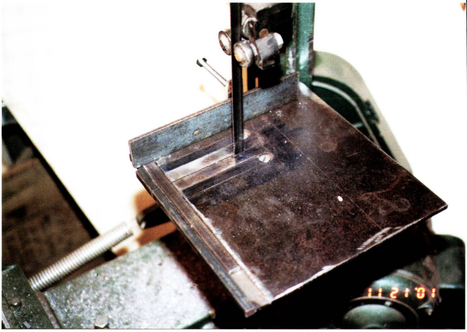
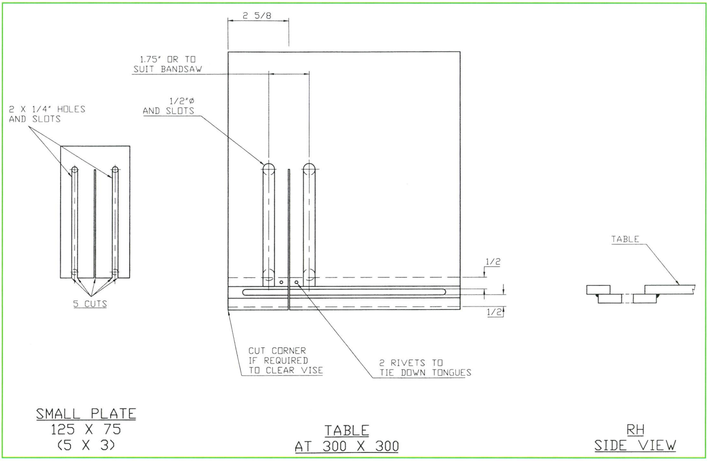


Table in position for vertical operation — with fence, filler pieces are in their slots, showing only the screw heads.

(d) It has a flat under-surface so things can be more easily clamped to it.

(e) The slot in the original table was too wide for working on narrow workpieces so this one has a saw slot only as wide as the



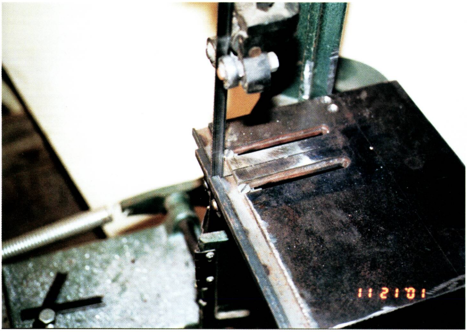


Table moved back ready for horizontal cutting. Note that the two 'fillers' have been removed and the fence is removed.

blade. It effect, it cuts its own slot.

(f) The new table, although not the fence, can be made in less than half a day.

(g) The optional fence takes longer to make. Whether the builder makes this easily adjustable fence or uses a simple angle bracket clamped to the table, some sort of fence is essential when slitting wood, metal and plastic into narrow strips for miniature 'planks' for planking boats, making springs, or roof lining boards for locos.

Discussion

A lot has been written recently about this bandsaw and a major series in four parts on improving it appeared in the *Model Engineer* in 1992 under the heading *A Silk Purse*, by Ted Wale. He removed the wheels and strengthened the legs, altered the power cable, made a much larger table, discussed blade alignment, and other things. His table was so big it required external support and that certainly prevented the saw being used in horizontal mode. I decided that such a big table was not necessary for my work, if only because the throat limits you to about 5 inches depth anyway. I settled for about 10 x 10 inches, but it is by no means critical and 12 x 12 inches is possible.

The only critical dimension with the design described here is the width of table to the left of the blade. This must not be more than 2⅝" or it will not clear the main column, and the other important dimension is the spacing between the mounting screw slots. On my machine this is 1¾ inches but check with your own machine. You can put as much area as you like at the back and on the right hand side of the blade but not on its left side or front. The depth of the slots fore and aft determines how far the table can slide backwards and forwards, so their length is not critical, but in general their length should be about half the total front to back length of the table. That allows the blade to be approximately centred.

Materials

The main item required is 4mm mild steel plate: If it is rusty, a quick run-over with the linisher (belt sander) will clean it up. If it still has its black oxide coating, a ten minute dip in 10-15% hydrochloric acid as per the articles in *AME* by Peter Lukey and later by me, will fix that. Do NOT use sulphuric, or use acid that has been used for pickling copper.

The other requirement is 12 x 4mm flat steel strip. Or if available, 16 x 4 would be even better.

1. One piece of 4mm steel plate, say about 10 x 10 inches (250 x 250), for the top of the table. It can be larger or smaller as discussed above.

2. One piece of the same plate 5 x 3 inches (125 x 75) for creating the tee-slots when welded underneath. In general, its width is always about 3" and its length about one inch longer than the length of the slots in the table.

3. Two flat-head slotted screws to replace the existing countersunk screws. Their heads should be just less than the thickness of the plate. My screws are ¼" x 20 so all I had to do was cut a couple of cadmium plated Whitworth bolts down to ¾" long threads and put a wide saw cut in the heads.

4. For the optional fence assembly:

Four pieces of 12 x 4mm strip the same length as the width of the table. Three are required to fabricate the slot, and the fourth is for the guide bar itself.

One piece 150mm long of 38 x 4mm flat – for the upright part of the fence.

One headless ¼" machine screw about 1" long, with washer and wing-nut.

Construction

The table

Mark out the slots on the two plates. Space these slots the same distance apart as the spacing between the two mounting holes in the blade guide on your machine. This is 1¾ inches (43mm) on mine. Drill ½" (12.5mm) holes in the big plate at the end of each slot and drill ¼" (6.5mm) holes in the small plate. The slots are half an inch wide in the large plate for the head of the screw and a quarter of an inch wide in the small plate for its shank.

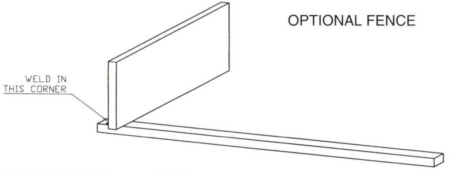
Then make the five simple straight saw cuts into each plate as per the drawing. The intervening strips will drop out. Keep the two wider ones and discard the narrow ones. Clean up the edges of the slots with the file. Tack-weld the smaller plate to the under surface of the large plate so as to create the tee slots, aligning the central saw cuts with a scrap of 1mm steel.

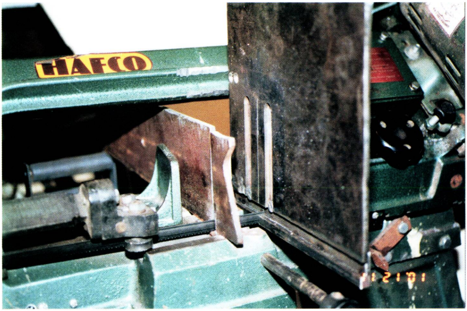
NB: If making the fence option, this smaller plate underneath should start about 8mm back from the front edge of the table. Otherwise it can be flush to the front edge. The reason will become clear later. Do NOT weld all along the edges of the plates or they will end up badly distorted. Just tack at intervals. Clean up the two wider pieces sawn from the slots so that when the table is in use, they can be dropped back in to fill the gaps in the surface. That finishes the table if there is no fence.

The optional fence

For one-off slitting jobs it is always possible to lash up a temporary fence by clamping a piece of angle iron to the table, but this fence is more convenient. Construction involves fabricating a single tee-slot similar to the two constructed for the two mounting screws except that this one runs transversely left to right across the

OPTIONAL FENCE





This view shows the table still in the horizontal mode of operation.

front edge of the table. The slot is for the fence's guide bar to run in. Some builders might prefer to mill out a tee-slot from solid. That will be neater, but fabrication is easier and quicker. However fabrication does require some care in setting up the pieces for welding. I will not go into details again since the construction is basically the same. Make sure that the front edge of the table is clean, straight, and square to the saw blade before you start because that edge forms the back edge of the guide bar slot.

NB: The bottom plate (the 5" x 3" piece) that formed the two main tee slots must finish back about 8mm from the front edge of the table top to allow for the fabrication of the transverse slot underneath. When assembling in preparation for welding, temporarily use a spare piece of steel the same width as the guide bar, in the guide slot. This is to hold things at the correct spacing. Hold it tightly because it can be freed up after the welding and hand-fitted to yield free movement with the minimum free play. Make sure everything is square and flat and well clamped for the welding.

The last thing to make is the FENCE itself. This is made by welding the 38 x 4 flat to one of the lengths of 12 x 4 about 10mm from what will be its left hand end. It must be exactly square to the bar and stand exactly vertical. This weld can only be made on the narrow back of the upright part of the fence or it will interfere with the bar sliding in its slot. The fence is not a rugged device intended for very deep cuts in metal the way you would use a circular saw with timber, but is ideally suited to slitting thin work pieces. This bandsaw just doesn't have the power or strength for wide heavy cuts.

The screw for locking the fence in its guide slot is a ¼" screw welded into the bar so that it projects down through the slot. It is finished flush with the surface of the table on top. A washer and wing nut complete the locking mechanism.

Finishing

To provide rust protection, give the whole thing a rub over with lanoline dissolved in white spirit, as described by me in these pages. I have found this to be far superior to mineral based oils and greases. Since that article was published I have come across a commercial product called Lanoguard® manufactured in Queensland by Ramshead Products. Their web site is **www.ramshead.com.au**. Alternatively the under surface can be painted if so desired.

Removable extensions

Unlike the factory table, it is relatively easy to add a removable slide-in extension to the RH side or the back of this table. Ideally it would be made of aluminium plate of the same thickness, for lightness, but I do not propose to go into any detail, as I have not built it and so far don't consider it necessary.

Usage

Unfortunately this table does not remain square and true each time it is moved. There is no way we can maintain alignment with this simple arrangement. Exact alignment is not important when working freehand but when the fence is used the table needs to be adjusted so ensure that the fence is reasonably parallel to the blade. Slight errors in alignment are not important because the 'set' in the teeth of the blade allows it to track the width correctly.

Note that the fence can be used on either side of the blade – whichever suits the job best. It must be removed to use the bandsaw in horizontal mode but that only involves undoing the wing nut holding the guide bar, and in any case the fence is not something that is required often.

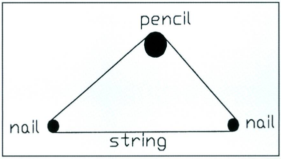
Drawing Ellipses

by Geoff Murdoch

Having difficulty creating an ellipse? Then try the following:

1. Place a piece of paper onto a piece of wood.
2. Tap two small nails through the paper and into the wood.
3. Join the two ends of a piece of string to form a circle.
4. Place the circle of string around the two nails.
5. Place a pencil inside the piece of string and pull the string tight around the two nails with the pencil.
6. While keeping the string tight, move the pencil around the piece of string.
7. Whalla! One ellipse.
8. By trial and error you can change the shape of the ellipse by changing either the distance between the two nails or changing the diameter of the circle of string.

Reproduced courtesy of the QSMEE "Oilcan" (Autumn 2003) which can be seen at www.tracksandtrains.com



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Steam Chest

with Dave Harper

Hi there, steam fans, and welcome to another collection of condensate from the steam chest. I have so much stuff to share with you these days that it's getting hard to know where to start! I guess the material left over from last issue will be a good start — the Goulburn beam engine and steam accumulators. There's also another mystery engine, and a book about steam winches. Well, about a bloke that used to operate them, anyway...

Goulburn Beam Pumping Engine

I'm indebted to Glenn Rigden for supplying the following information on a ceremony held in Goulburn in April of this year.

The Sydney division of the Engineering Heritage Committee of the Institution of Engineers Australia placed a plaque at the Goulburn Waterworks naming it as an Historic Engineering Landmark. The wording of the plaque is as follows:

> **Historic Engineering Marker**
> **Goulburn Waterworks**
>
> The original water works comprising Marsden Weir, the pumping station and its equipment, was designed and constructed between 1883 and 1886 under the direction of E.O Moriarty, Engineer-in-Chief, Harbours & Rivers of the Public Works Department, NSW. Construction was supervised by engineer H A Moriarty and the works were managed for Goulburn City Council by engineer Edward J Woodhart from 1887 to 1922. The water works as upgraded, supplied water to Goulburn up to 1977. It is of State heritage significance and is the only remaining intact example of its type in NSW.
>
> **The Institution of Engineers Australia and Goulburn City Council, 2003.**

The waterworks operates as a museum these days and bookings can be made by phone on (02) 4823 4462 or (02) 4823 4448 or by email on **museums@goulburn.nsw.gov.au**

Engine details

The beam engine in the Goulburn waterworks is indeed a rare survivor, and Glenn kindly sent a whole CD full of photos of the ceremony, the engine and surrounds. Unfortunately, in common with most large engines, it's impossible to get one picture showing the whole engine as it's so huge and in such a confined space. However I've selected a few to give an idea of its appearance. **Photo 1** is the flywheel end, **photo 2** is a close-up of the beam and **photo 3** shows the cylinders, shown in close-up in **photo 4**.

The engine is a Woolf compound type with cylinders of 9" and 18" bore x 5ft stroke at the HP cylinder. It operated on 60psi of steam using slide valves incorporating Myer cut-off gear.

The flywheel is 17ft diameter and weighs 25 tonnes, the beam is 20ft long.

The engine was built by Appleby Bros, Engineers of London in 1883 and was commissioned in 1886. It was in service until 1932, and was powered by two Lancashire boilers each containing 16 galloway tubes (see **photo 5**).

There is much more information on the heritage committee's web site **www.sydney.ieaust.org.au/heritage/heritage_index.htm**

For those without internet access I have some sheets of information which I'll gladly supply if you send me a SSAE via the editorial offices.

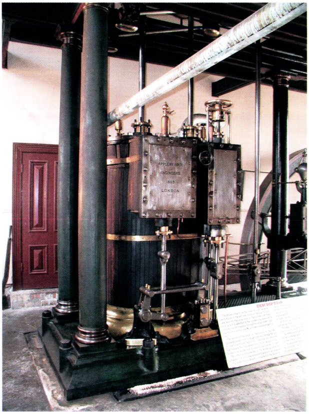


Photo 3

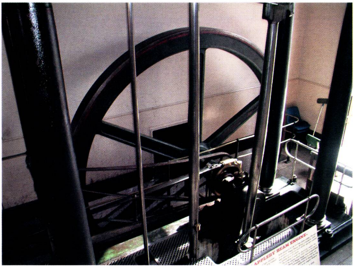


Photo 1

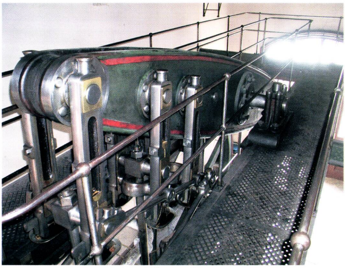


Photo 2

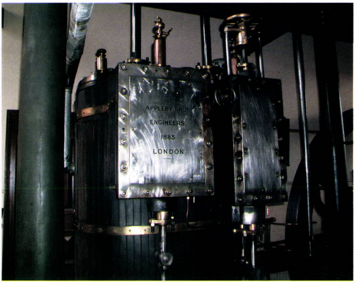


Photo 4

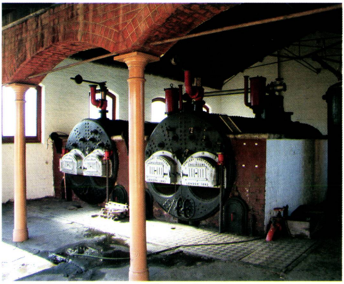


Photo 5

Not only, but also ...

Also in the museum grounds is a large steam winding engine, (see **photo 6**) which was apparently made by Grange Ironworks of Durham, England. It was first installed at the Sea Pit coal mine near Newcastle in 1888 and was later moved to Hebburn No.2 Colliery. It seems that it is the larger of only two winding engines remaining of the Newcastle area collieries. It certainly looks an impressive piece of machinery! ***Personal comment*** — The Goulburn beam engine seems to me to be a bit of an anachronism. The beam engine is the oldest form of steam engine, but this one has compound cylinders and Myer expansion valves! It seems that waterworks engineers were so wedded to the beam engine that they took a long time to appreciate the advantages of the, then new, vertical triple expansion engines. Maybe it was best to be conservative where such an important service was concerned. Anybody like to comment further on that?

Steam accumulators

These are another accessory that came along very late in the steam story. Only the last of the many textbooks on the subject have any kind of reference to them.

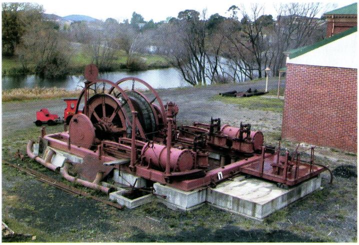


Photo 6

John Couchman from New Zealand mentioned that he saw one once in a textile factory, in the dye house. This is just the sort of place that apparently had use for such a thing. John's comment was that once its use was explained, he thought no more of it. Fair enough!

Tom Devoil emailed me with much more immediate knowledge of them. I'll quote his note...

I was reading through your article in the July-August AME when I saw your fig. 1 — a steam accumulator. It immediately reminded me of another steam accumulator that I came across some years ago during my engineering career in the RAN when I spent a couple of decades associated with steam propulsion systems.

Steam catapults in aircraft carriers required steam accumulators so that they could provide a large amount of steam at a fairly constant and predictable pressure when the catapult was fired to launch an aircraft. The one in your illustration was very similar, visually, to that in HMAS Melbourne.

The accumulator was fed directly from the forward pair of boilers which operated at 430psig (with a fair amount of superheat) for Flying Stations. The steam supply was controlled by the catapult operator and his charging actions made it difficult at times for the Petty Officer in charge of steaming the boiler to maintain a constant boiler pressure. Everything was manual in that old ship. I do not recall the accumulator pressure but it would have been a bit less since the boilers were four decks down and about 200 feet aft of the catapult.

The accumulator was a 'wet' accumulator with water maintained about half full. This assisted in maintaining a constant steam take-off pressure as vapour flashed off as pressure dropped in the accumulator during the firing of the catapult. I understand that more modern accumulators (in US ships) are 'dry' accumulators. The pressure vessel was welded construction, and obviously had fairly modern steam fittings and safety features.

Another piece of trivia for your data bank! Thanks very much for that information, Tom. Certainly there could hardly be a more critical use of steam than catapulting aircraft from a carrier! I believe that the weight of the aircraft is critical, and is confirmed before each launch by a sign held up by one of the deck crew before firing. The pilot has to signal his agreement with the weight before the launch is permitted.

Despite efforts to develop electro-magnetic catapults, the steam catapult is still the only one used today, so far as I'm aware.

I was given some references to steam text books re accumulators, thanks whoever it was, I'm afraid I've mislaid that email note! The books concerned were *Steam*, by Reid and Renshaw, still the definitive Australian reference, and *The Efficient Use Of Steam* by Oliver Lyle, published in 1947 by HMSO in the UK.

I managed to borrow a copy of the latter book, and it was very thorough in its treatment of accumulators. There is a 40 page chapter entitled Energy Storage, covering numerous types and their uses!

I was much happier with Steam's treatment — it is concise and fits into two pages! **Figure 1** shows the different types of accumulator and this is what they have to say about them:

The accumulator was originally designed to improve electric generating plant efficiency by utilising turbine

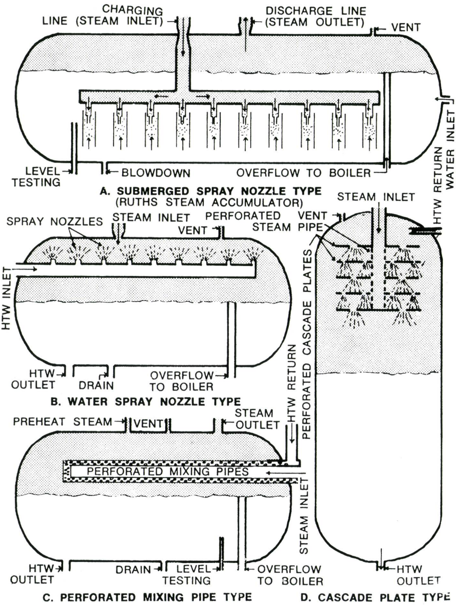


Figure 1

exhaust steam for generation of high-temperature water for distributing through district heating systems. Today it is also used to convert high temperature water to a lower temperature water for some distance (sometimes miles) from the boiler plant. The accumulator is widely used as a convenient means for dampening the load on direct-fired boilers. Heat is stored during off-peak periods so that it will be available, as lower pressure steam or hot water, to meet additional capacity demands. Breweries would be one instance where this is done.

The accumulator also offers the following advantages:

- Savings in boiler plant capacity.
- Increase in boiler efficiency.
- Rapid morning pick-up.
- Boilers can be located at a distance.

There are three distinct types of accumulators:

▫ The direct contact heater has a steam or hot water inlet located below the water-line. The inlet usually has a perforated pipe distributor to break up the flow and obtain better contact with the stored water. Another type of heater has a jet nozzle with a recirculating feature, see **A**.

▫ The perforated pipe heater returns water through a large perforated pipe. Within this pipe is a smaller pipe, also perforated, containing the steam or high temperature water. There is intimate mixing of the two fluids (**B** and **C**) The water spray nozzle type employs a somewhat similar arrangement as shown in B.

▫ The cascade heater is fitted with a series of plates. The return water is usually brought in from two sides and forced against the top plate, creating a fine spray which cascades down the plates. Steam enters at the top of the cascade. The intimate mixing of the steam with the small spray droplets provides both sensible and latent heat absorption that is both immediate and effective (**D**).

Steam does not carry over impurities into the system. The water level in the accumulator is automatically maintained as the surplus water is continuously fed back into the boiler.

So there you have it! Our education on steam has moved up another notch!

The book *Steam* is still published by Cole Publications in Victoria, and is available through Plough Books — required reading for today's steam engineers, no doubt....

Another mystery engine

Allan Wilson recently sent me a couple of photos he took some years ago in the Mildura area. The engine itself is no great mystery, looking like a fairly typical triple expansion pumping engine. The pump looks like a large centrifugal type, but the plaque that claims 'The Chaffey Engine and Section of Pump" has me intrigued. What or where was the rest of the pump? Also, what is the gadget sticking up above the

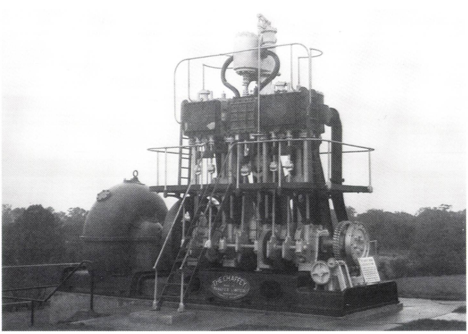


Photo 7

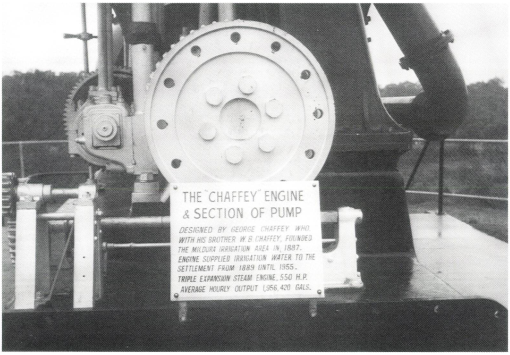

THE "CHAFFEY" ENGINE
& SECTION OF PUMP
DESIGNED BY GEORGE CHAFFEY WHO,
WITH HIS BROTHER W. B. CHAFFEY, FOUNDED
THE MILDURA IRRIGATION AREA IN 1887.
ENGINE SUPPLIED IRRIGATION WATER TO THE
SETTLEMENT FROM 1889 UNTIL 1955.
TRIPLE EXPANSION STEAM ENGINE, 550 H.P.
AVERAGE HOURLY OUTPUT 1,956,420 GALS.

Photo 8

cylinders? **Photos 7 and 8** tell the story.

Allan was curious about the worm gear on the end of the crankshaft. This is clearly hand turning gear for maintenance, etc. With all that gear reduction it would take a while to turn the engine over!

Is there anyone out there who can tell us more about this engine and Messrs George and W B Chaffey?

A book about steam winches

George Rayner from Victoria, well aware of my penchant for steam winches, emailed to ask if I'd be interested in the story of a man who spent much of his working life operating logging winches in the Victorian timber industry. You bet I would! Shortly after a packet arrived containing a paperback book which kept me glued to my seat for most of that day!

Echoes Through The Tall Timber, the life and times of a steam man, by Dorothy Owen is a very good read!

It is the story of Harry Matheson who lived from 1895 to 1984, a full life that spanned two world wars and the Depression. As the cover blurb says — 'Logging winches, axemen, steam engines, horse teams and tram tracks — the colourful era of the early years of the Victorian timber industry has now passed into history.'

Harry's daughter, Dorothy Owen has written a fascinating account of the life of her father and his workmates through the scorching summers, freezing winters, and the terrible fires of 1939, which were far worse than the Ash Wednesday fires. A worthwhile read for anyone with an interest in steam and/or the timber industry, indeed social history of times not that far gone! I believe the publishers, Brunel Gooch Publications, PO Box 401, Emerald, Victoria, 3782 still have copies available. The ISBN number is 0957869606.

Thank you George, for sending me what will be a valued addition to my library.

The Mount Miller steam winch

On my recent trip to Maryborough to see the loco *Mary Ann*, one of the volunteer group that looks after her, Don Reid, loaned me some photos and information on a steam winch that he's been involved with for some time.

Photo 9 shows Don proudly showing off the restored winch at the Port Curtis Historical Village in Calliope, Qld. **Photo 10** shows a closer view of the drive side.

The winch was built by R Rodger and Co. Ltd., of Stockton-on-Tees, England some time in the late 1800s. The cylinders are 8" bore x 10" stroke and have Stephenson link valve gear. Originally fitted with alternative high or low gearing, the second motion shaft has gone missing somewhere along the way.

The winch was installed at Mount Miller Mining Company Ltd., a magnesium mine on the banks of the Calliope River in about 1904. The mine operated until 1916, then lay idle until 1940 when BHP recommissioned the boiler and winch and used the machinery to unwater the mine to see if it was worth working again.

The winch remained on site until 1980 when it was recovered by the late Mack Reid and his friend Bob Beak, and taken to Bundaberg.

In 1997 the winch was taken to Gladstone where it was restored to its present condition with help from numerous friends including

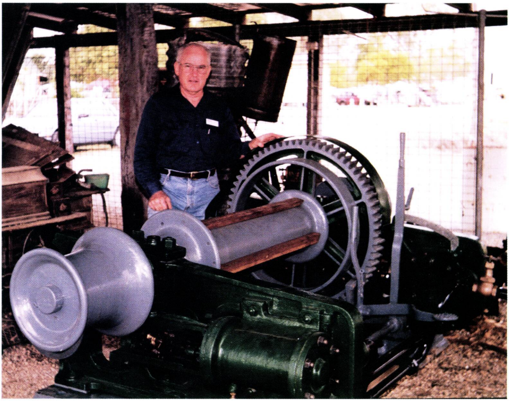


Photo 9

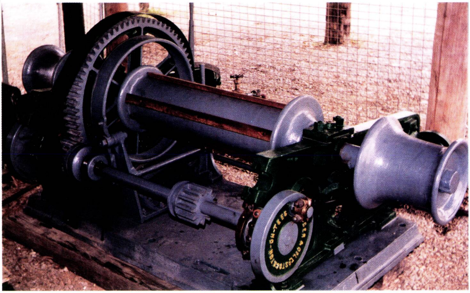


Photo 10

Peter Olds of Maryborough.

Don Reid played a major role in the restoration as the present owner, and is happy for the Port Curtis Historical Society Inc. to have it on loan for display.

Thank you, Don, for another snippet of winch history — it made the trip to Maryborough even more worthwhile!

More steam on the Net

Steam buff Ray Gardiner emailed me about the recent discussion on reciprocating pumps in *SC*. Apparently there is a web group that specialises in such pumps. Known as Steam Lizards, (because they're smaller than steam dinosaurs!) this group can be found at http://groups.yahoo.com/group/steam lizards/

I was also invited by James Hefner, an active member of the group, to join. He tells me that they have photos of over 400 full size steam pumps in their listing, with hundreds more to be listed, many of which were found by Ray Gardiner in Indonesia.

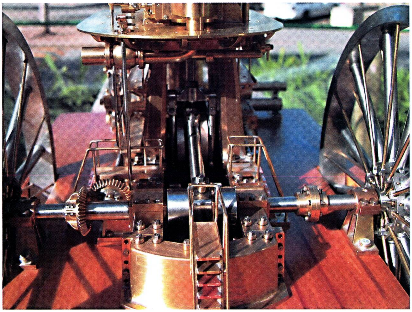
There are also drawings of pumps in the Files section.

Ray's friend Rob Dickinson also has a large web site with much information on their trips to Indonesia and the steam locos and other machinery they found there. Rob's site is at http://dialspace.dial.pipex.com/steam/internat.htm

That seems to be more than enough for this time! Hopefully I'll have room for more model photos next time. Until then, happy steaming!

You can e-mail Dave at
sandave@bytesite.com.au
or write to him via the AME office

***Below** — In the last issue the printers inadvertently omitted photo 11 on page 23 and inserted photo 10 twice. Here is the missing photo 11, which gives you another view of Bill Strotz's outstanding model of the* **Superior** *engine.*



Keep it Simple

3. A simple counter weight system for the drilling machine

by Murray Lane

Unfortunately as we get older, we become unable to do things as easily as we could, when we were young. One of the ways this manifests itself in the workshop is the effort needed to raise the drilling table of the workshop drill. Lifting the table (10 kg on my machine) from chest height to a higher position can be a real struggle for most of us and of course is even harder for shorter people, particularly if the drill is mounted on a bench. The problem is acerbated when the table is loaded with say a vice and a work item. Some times there may be larger weight, such as a compound table, or rotary table (another 10 kg) to lift as well. (**Photo 1**) Often the table needs to lifted in the middle of a job when the table height needs to be adjusted when changing to a larger drill which may be too long to put into the chuck. The main reason for the difficulty, apart from the weight and height factor, is due to the awkward position the lifting has to be done from. Most of the lifting has to be done from the front of the table after the clamp has been released, which tends to make the table collar on the main column jam as the table is tilted from the front. Most of the time the table also requires some lifting force to be applied

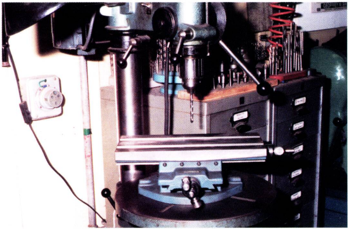
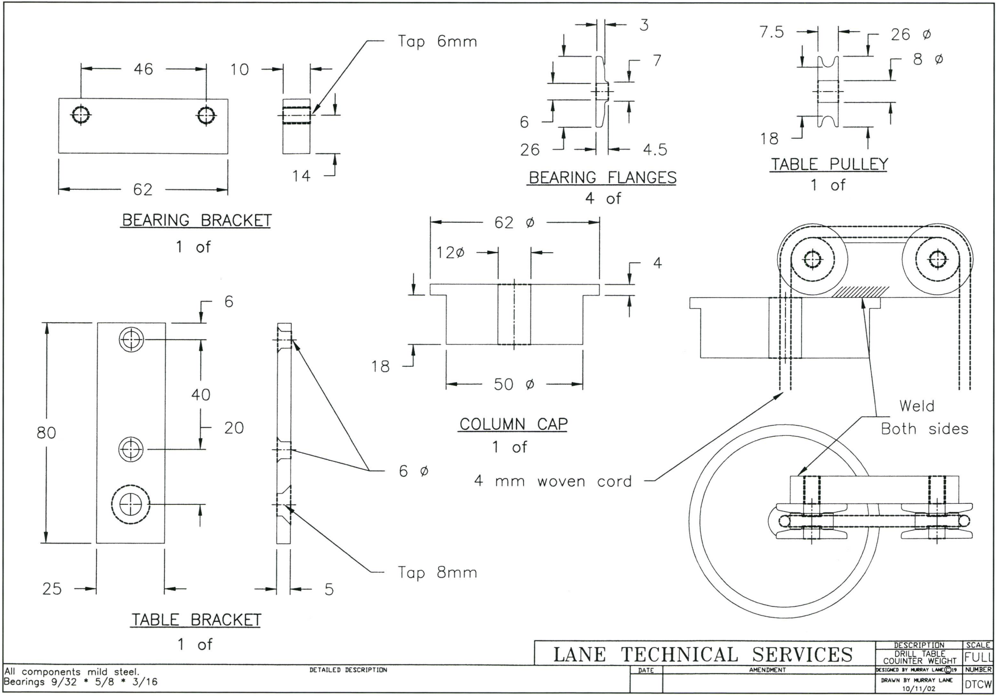


Photo 1 — Drill table with a compound table. The counter weight cord can just be seen at the back of the column.



All components mild steel.
Bearings 9/32 * 5/8 * 3/16

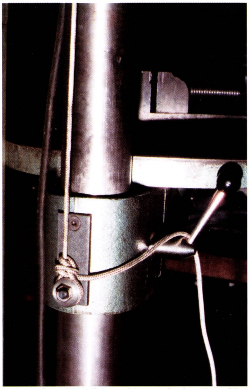


Photo 2 — How the cord is attached to the table

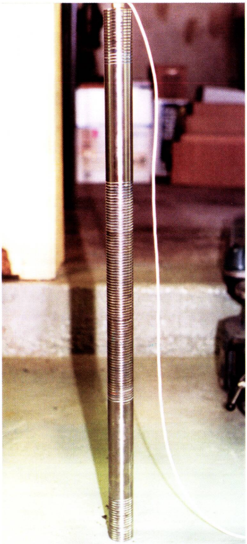


Photo 5 — The two counter weights are screwed together with a 10mm stud.

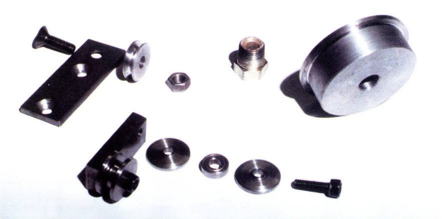


Photo 3 — Parts required. The nipple was used to tie the cord to the counter weight. It is threaded onto the end of the cord and a knot is tied in the cord.

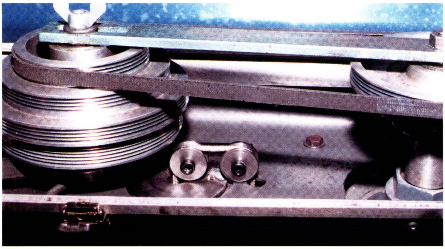


Photo 4 — The assembled fitting on top of the column

to the back of the table collar at the same time. Once lifted to the required position, the back of the table has to be released so that your hand can be used to tighten up the clamp again. Of course if you are lucky enough to have a drill with a rack and gearbox this is not a problem.

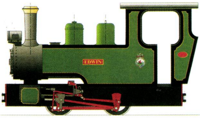
This modification is so simple, but effective I wish I had made it years ago.

Some general comments to go with the drawings.

1. The counter weight I used on my floor mounted machine, were two large bolts, which fitted inside the support column. (**Photo 5**). Total weight 10 kg. If the drill is bench mounted it may be necessary to drill a hole in the base casting, and a matching hole in the bench. In this case the weights can be any suitable heavy lumps of metal.
2. The column cap dimensions should suit the drill column.
3. The distance between the tapped holes in the bearing bracket should spaced so that the cord running down the outside of the column is clear of the collars on the column.
4. Like wise the table pulley will need to be packed out with suitable washers for the same reason. (**Photo 2**)
5. Drill a 12 mm hole through the bottom of the belt guard to suit the cord position for 3 and 4. (**Photo 4**)
6. The 8 mm counter sunk bolt that the pulley is fastened to, needs to be tapped into the table bracket to prevent it from turning, as once this is fastened to the table ring, the head of the bolt is covered.
7. The inside face of the bearing flanges are machined, so that when the cap screw that holds the unit to the bearing bracket is tightened, the out side of the bearing is still free to rotate.
8. Any suitable size bearing can be used.
9. The cord I used is the woven type available in ship chandlers.

AME's email address is ame@netspeed.com.au
The old Bigpond address no longer operates.

EDWIN



A freelance Fowler style 0-4-0 tank locomotive in 16mm scale for 32 and 45mm gauge

by Brian Wilson

Part 4

Drawings and photos by the author unless otherwise indicated

Valve chest

The valve chests are made from brass 19mm x 10mm. The guide for the gland can either be made from a separate piece as shown in the drawing and silver soldered in, or turned from the solid piece. Either way, the bore and gland for the valve rod must be parallel to the faces of the valve chest. Using the method of turning from the solid, cut off a piece of brass about 38mm long and turn down one of the faces to give a thickness of 7mm. Mark out the position for the valve rod hole on the rear face and set up in the 4-jaw chuck with this mark on centre. Drill 1/16" to a sufficient depth and then drill and tap 3/16" x 40 for the gland nut. Turn down to form the guide. (If you use a separate piece, still set up the same way, but drill a 4mm hole to take the turned piece). Remove from the chuck and mark out for the rectangular centre cavity. This can be removed by chain drilling and filing and/or milling. Mark out and drill the 10BA clearance holes for fixing to the cylinder.

The cover for the valve chest is made from 1.5mm thick brass, making sure that it is nice and flat. Applying marking blue as appropriate, spot through all of the mounting holes. The covers and the cylinders are spotted through from the valve chest and the cylinder ends from the covers. Be sure that the flat for the guide bar on the rear cylinder cover is vertical. Drill and tap all the mounting holes in the cylinders. Watch carefully the depth of some of these to avoid breaking through into the bore.

The curved corner of the cylinder can be shaped at this stage. There are various ways of machining this corner off such as gripping the cylinder in a mandrel and using the tool held in the tool post as a shaper by running the carriage along the work as it is rotated. These methods are fine, but I am sure that by the time you have everything all set up, it would have been just as quick to hacksaw and file the shape. The choice is up to you.

Valve

The valve can be made in two pieces, silver soldered together. This makes the cutting out of the exhaust cavity easier. From a dead flat piece of 1.5mm brass, cut out the valve face. This will be a rectangle 10mm x 10.5mm. Silver solder this onto a brass block 10mm x 10.5mm x 4.5mm thick. Clean up the edges, taking care not to touch the sharp edges of the valve face, and cut the two 1.5mm slots to take the valve rod and nut. If you have a slitting saw this can be done in a milling operation, otherwise the slots can be sawn and filed. It is important to make the nut a good sliding fit and for it to be perpendicular to the valve rod.

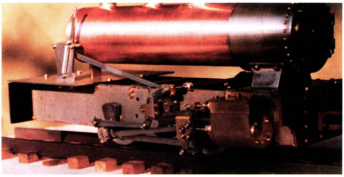


Photo 2

Valve rod and crosshead

Grip some 1/16" stainless rod in the chuck and thread 10BA for 10mm. Take this slowly, using plenty of cutting lubricant and frequently reversing the die to clear the chips. The stainless tears easily and it is savage on your expensive 10BA die. The cross head is made up from brass and if you set it up carefully in the 4-jaw chuck to drill the hole for the valve rod, it should be possible to get the rod perpendicular to the crosshead pin. Silver solder the rod in place.

Valve rods

The valve rods are cut from 1.5mm thick mild steel and again the holes and threads should be done before cutting the outsides to shape. Do not make the eccentric rod yet, it's exact length has to be determined later when setting the valve gear. It will save time to make all the valve pins at once, six are needed on each side, plus two for the reach rod. Make the lengths to suit and allow a little sideways clearance.

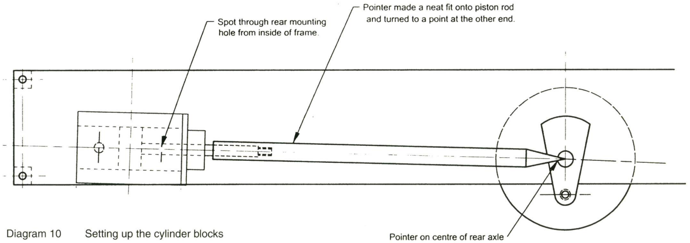

Spot through rear mounting hole from inside of frame.
Pointer made a neat fit onto piston rod and turned to a point at the other end.
Pointer on centre of rear axle

Diagram 10 Setting up the cylinder blocks

Reversing lever and stand

These items are quite simple to make and no particular accuracy is required. Small packing pieces 3mm diameter and a full 1.5mm thick are used over the 10BA bolts to separate the quadrant piece from the stand. The handle can be screwed or soldered onto the lever, and the spring needs to be firm enough to hold the lever from jumping out when the engine is working. If you are going to fit radio control to the reversing lever, then the slots may not be needed. The length of the reach rod must be determined from the job. (**See photo 2**).

Reverse lever and lifting arm

These can be turned up from solid rod and then cut out or alternatively built up and silver soldered. To build them up, turn three pieces 2.5mm long, two of 4mm dia for the lifting arms and one of 7mm dia for the reverse lever. Silver solder these onto a piece of 1.5mm thick sheet and roughly trim to size. Mount in the 3-jaw by the round stub and drill 3mm and 2mm as appropriate, at the same time marking the 11mm centre distance. Remove from the chuck, drill and tap the 10 BA holes and finally shape and polish. A 3mm grub screw is fitted to the reverse lever while the lifting arms are secured with Loctite and/or preferably a 1mm or 3/64" pin drilled through. The lengths of the lifting links should e checked from the job.

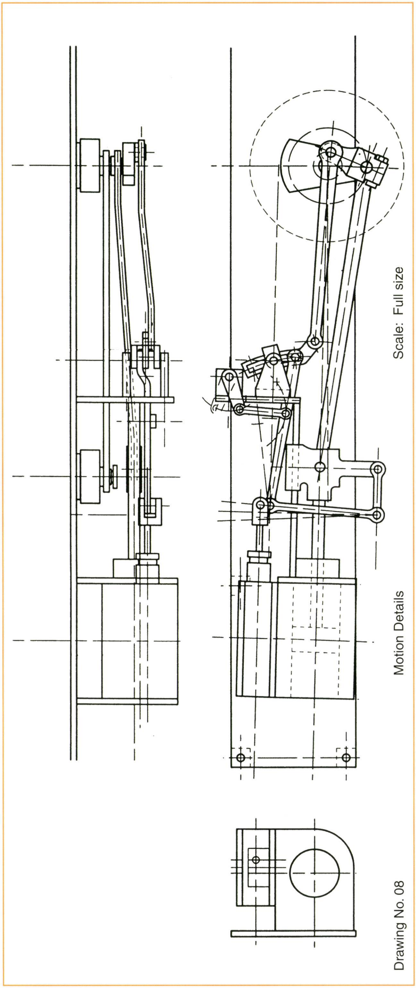
Assembling the motion and setting the valves

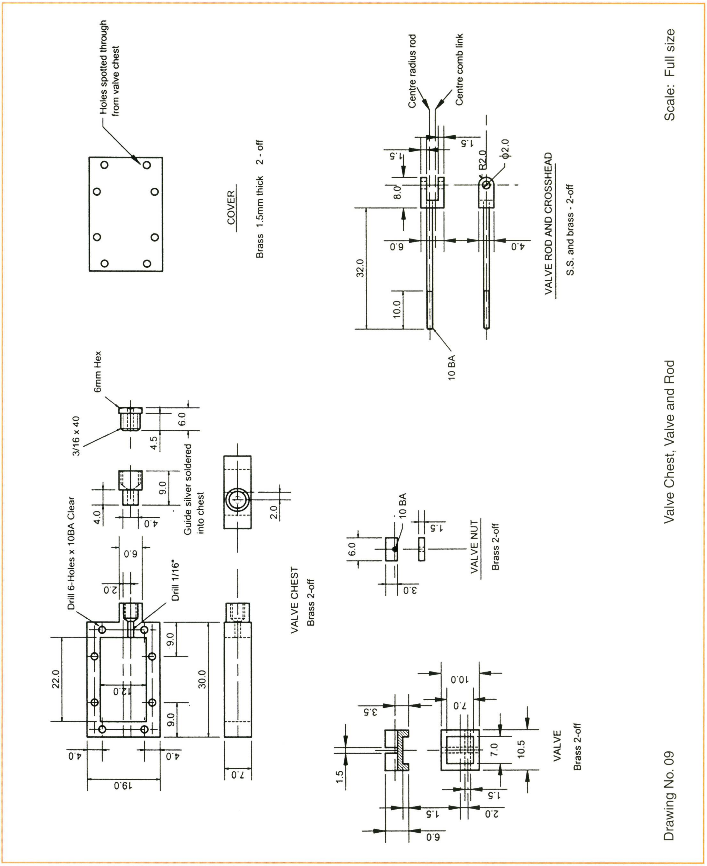
We can now assemble the motion and valve gear and set the valves. So far you will have the frames assembled and the wheel and axle assemblies in place with the cranks quartered. At this stage leave off the footplates as they will only get in the way.

Bolt the rear cover onto the cylinder and insert the piston and rod assembly. It should move freely back and forth in the cylinder. Make up a pointer from a piece of say, 5mm diameter rod. Drill it to fit firmly over the piston rod at one end and turn a point at the other end, making it just long enough to reach the centre of the rear axle when the piston is about half way or more towards the front of the cylinder. (See **diagram 10**). Bolt the cylinder into position with the front mounting bolt and line the pointer up with the centre of the rear axle. Spot through the mounting hole drilled in the frame onto the cylinder for the rear mounting hole. Remove, centre punch, drill and tap 6BA. The cylinder can now be bolted securely in position.

Next, to mount the motion bracket, screw the crosshead onto the piston rod, cut the slide bar to length and drill a 10BA clear hole 2.5mm from the front end. Lightly clamp the motion bracket in position on the frame, lining up the top of the frame where indicated on the drawing of the motion bracket. Check that the crosshead moves freely on the guide bar, and when you are satisfied that everything lines up, spot the mounting holes through the frames onto the motion bracket for 8BA clear holes, and the 10BA thread into the cylinder cover.

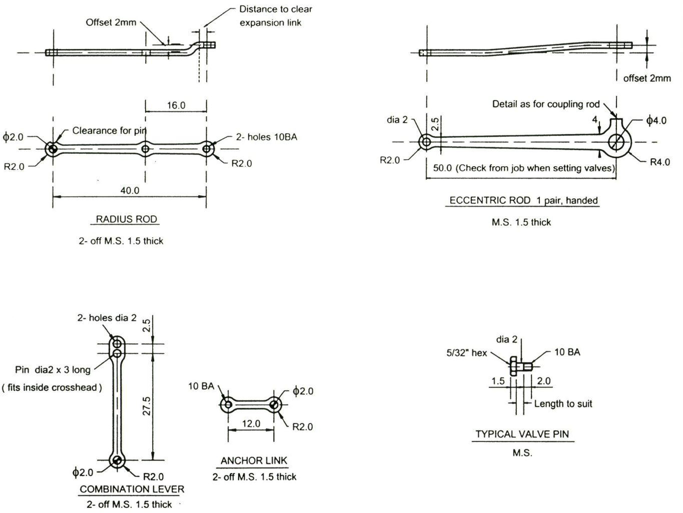
Now all the motion and valve gear can be assembled and set, and a measurement taken for the eccentric rod. Note that the pin through the front end of the radius rod is a short headless pin which is held in position between the cheeks of the valve crosshead. A groove will need to be filed into the radius rod just above this pin to clear the valve crosshead pin just above it. When doing this, care must be taken not to go through into the hole, as quite a bit has to be taken out to avoid binding through all positions of the gear. The reversing lever can also be set up at this point and the positions of the locating pin filed into the quadrant





on the reversing lever stand. When doing this, make sure that the die block travels it's full distance in the expansion link without being forced, as it needs to be able to rock a little as the gear moves backwards and forwards.

It will probably be necessary to provide some extra clearance for some parts. Particularly, the top of the motion bracket will need to be filed to accommodate the radius rod in reverse, and it may be necessary to file some off the rear top of the crosshead, again to clear the radius rod. Because of the small scale of things and the large number of component parts which make up the whole movement, it is difficult to have the valve gear working precisely as it should and some compromises may have to be made. Let us remind ourselves, however, that the objective is to produce a fun locomotive, which is run for enjoyment and not to haul huge loads for profit or passengers to a tight schedule. Having said that, if you have taken reasonable care there should



Drawing No. 10 Valve Rods Scale: Full size

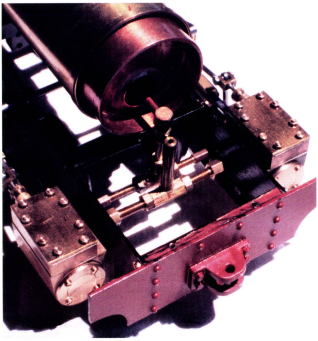


Photo 3

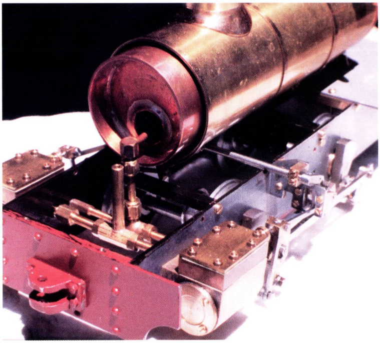
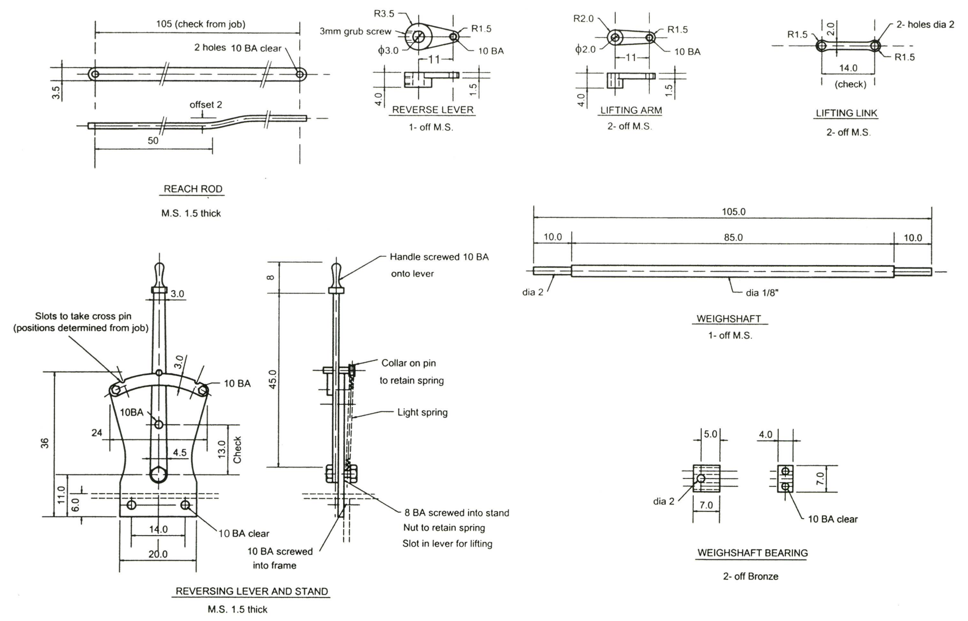


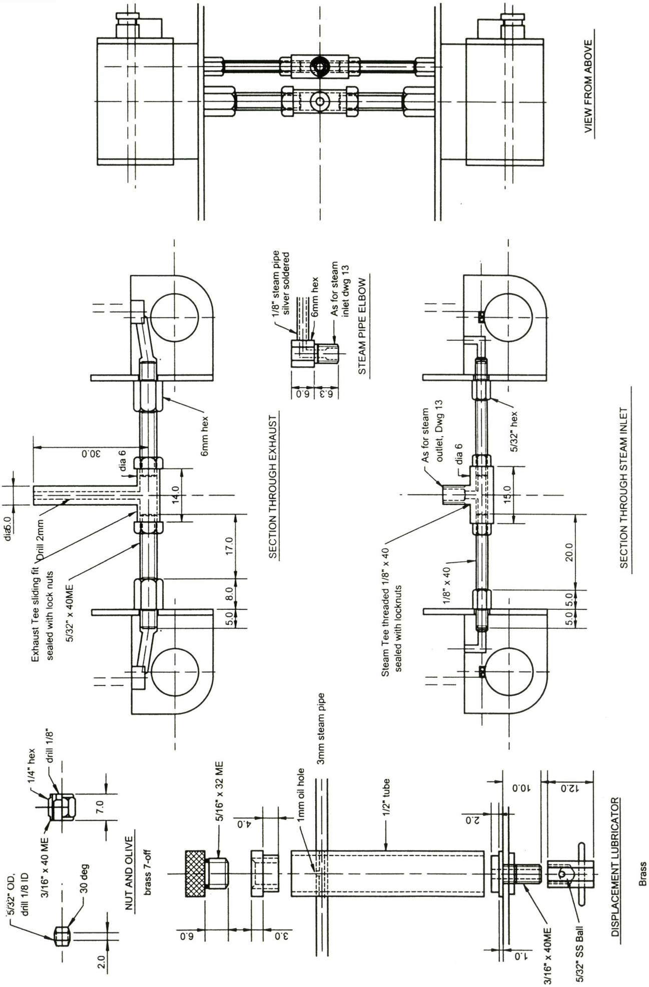
Photo 4



Drawing No. 11

Weighshaft and reverse lever

Scale: Full size



Scale: Full size

Steam Pipes and Lubricator

Drawing No. 12

be no major problems and the locomotive should run well and give many hours of trouble-free service. Remember we are making a steam engine, not a Swiss watch!

Set the return crank as closely as possible in its position on the crank pin and lightly screw the clamp. The eccentric should lead the crank pin by 90 degrees, and be running on a pitch circle of about 7.5mm. Place the main crank on forward dead centre and the expansion link in mid position. That is, when the radius rod is moved up and down, there is no movement of the valve. At this point, take the distance between the centre of the offset hole at the bottom of the expansion link and the centre of the hole in the return crank pin. (Dividers or vernier callipers can be used for this). Repeat this with the main crank at back dead centre. Both measurements should be exactly the same. If they are not, then adjust the setting of the return crank until they are. When these measurements are the same, this also is the length of the eccentric rod, i.e. the distance apart of the holes. The eccentric rod can now be made and fitted.

Finally, the valves themselves can be set on their spindles, by screwing the nut until their movement is equal over the ports. The total valve movement should be 3.5mm. Check both forward and reverse, and even out any discrepancies which may have been caused by slight inaccuracies along the way.

EDWIN components now available

As mentioned in the last instalment the author has been able to source many of *EDWIN*'s components for you.

Full set (approx 30 components)

comprising laser cut frames, footplates, beams, main rods, valve rods, expansion links, reversing lever and stand for **$112** (incl. P&P within australia)

Part set

comprising the above without frames, footplates and beams can be made available for **$85** (incl. P&P within Australia)

Lost wax castings

includes 1 pair crossheads, 1 pair return cranks, 1 smokebox door, 1 chimney base and 2 dome bases **$87** (incl. P&P within Australia)

Purchase direct by sending a cheque or money order to:

Brian Wilson
PO Box 525
Toowoomba Qld 4350

Overseas readers should enquire about additional mailing costs.

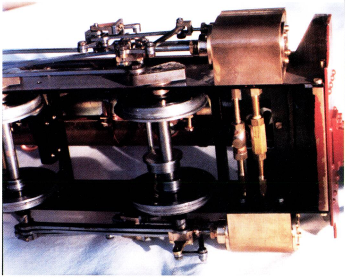


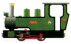
Photo 5

Steam pipes and lubricator

The main difficulty when making the steam and exhaust connections is the small amount of room there is to work, otherwise everything is quite straight forward. Final measurements should be checked from the job and the lengths of pipe should just allow the various pieces to be assembled with very little clearance. (See **photos 3, 4 and 5**). Remember not to over tighten these fittings, as some of the pipes are very thin where the threads are and will break easily. Using a thread sealant should prevent any leaks. As the pressure being dealt with is very small, the exhaust tee only needs to be a sliding fit over the exhaust pipes from the cylinders, being sealed by the locknuts. The nuts and olives for the 1/8" pipe connections can all be made now, a total of seven will be required, but it would be a good idea to make a few spares while you are set up. Shape the end of the nuts as shown for appearance and just leave 1mm or so inside to butt up against the olives. Make the olives from 5/32" brass rod by firstly rotating the tool around to get the first 30 degree angle, drill 1/8" and then leave the drill bit in for support and part off with the tool set around to get the other 30 degree angle.

Once these fittings have been screwed into place you can test the chassis on air, or if you have a shop boiler, make and fit the lubricator and you could try it out on steam!

Next time we build the boiler ...



SASMEE Locomotive Efficiency Trials Day, 2003

by Allan Wallace

Some years ago I was approached by fellow model engineer John Lyas about jointly building a model of the SAR/VR dynamometer car which is currently preserved at the National Railway Museum in Adelaide, South Australia. In due course, the model was completed and it has been seen at several conventions and tracks. I gave a talk at a club meeting recently and several members expressed an interest in holding a locomotive efficiency trials day. A date was fixed, a roster drawn up, officials appointed and a manual created. Saturday 14 June 2003 became the first SASMEE Locomotive Efficiency Trials Day.

Externally, the dynamometer car is a close 5" gauge replica of the prototype in its early livery. Internally, it is very modern. The front drawbar is linked to an electronic load cell, and the wheels drive a DC tachometer and an optical revolution counter. A box of electronics conditions the signals, converts them to digital format, and transmits them to a laptop computer carried on a conventional passenger truck behind the car.

The laptop computer displays a scrolling "paper" chart, like the original instrument table, but it reads data every second and stores the information on disk for subsequent display or printing.

A full technical description of the dynamometer car can be downloaded from my website, at **www.avocetconsulting.com.au/modeleng**. You can also download the graphical data from all the runs done during the trials day.

Figure 1 is a typical display.

We used the outer (7¼"/5" loop for al the tests. Locomotives towed the dynamometer car and a train for about 30 minutes. Coal was taken from a weighed batch and the firebox refilled to its starting depth at the end of the run. Only the load from the dynamometer car back was included in the work done tally. Two of the 5"g engines were not set up for tender riding, so those drivers sat on the dynamometer car and hence were included in the train load (to their advantage).

The grades around the circuit are not severe, but generally the drawbar pull becomes a push at some places when the locomotive slows down and the train pushes the engine. The software was set to ignore negative drawbar force so that locomotive braking did not reduce the work tally.

To calculate the thermal efficiency, the useful work done at the drawbar (measured by the dynamometer car, in Joules) was divided by the energy released by the burnt coal.

Figure 2 shows the relative thermal efficiencies in rank order.

Efficiency is the ratio of output/input, so it is a valid index for comparing locomotives of any scale. **Figure 3** breaks the efficiency into its two components for each engine, where drawbar power is the Output, and coal rate is a measure of Input.

If the engines had been loaded equivalent to their potential performance levels, one would expect the larger locomotives to use more fuel, and do more work, than the smaller ones.

In **figure 5** the coal burnt, and the work done, have both been divided by the running time to express them as watts, and kg/hr, which allow direct comparison. The thermal efficiency can be obtained by dividing the average drawbar power by the coal rate (after conversion to watts). The last column signals whether the driver's mass was part of the train or not.

This is the first trails day of its kind at SASMEE and it has been most instructive. Clearly, most of the engines were not working very hard, which would adversely affect their thermal efficiency. There would be an optimum power output where the efficiency is a maximum for any engine. One of the challenges for drivers is to choose a load near to this optimum. Inspection of the individual datalogs showed that *Speedy* was working against moderately dragging train brakes, and even had to pull the train downhill! For this reason this run produced the highest work done.

We felt that the biggest shortcoming in the procedure was the measurement of coal consumed. Even with the best intentions, one cannot be sure that the level of fuel in the firebox is the same before and after the run. The accuracy can only be improved by running longer or harder, and thereby burning more coal. Ideally, the coal consumed should be several times the volume of the fire. *Koppel* did not require any firing for the entire duration, because the mass of its fire was large compared to the coal

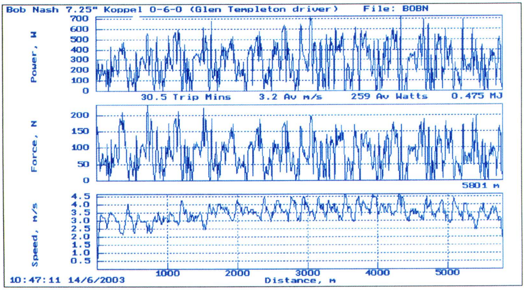


Figure 1

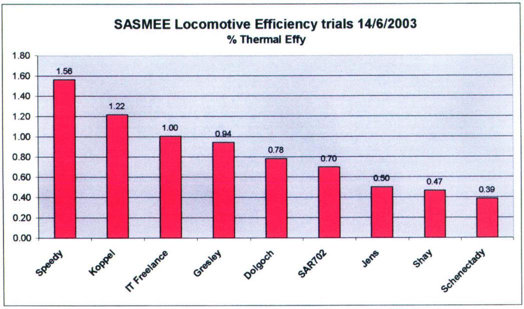


Figure 2

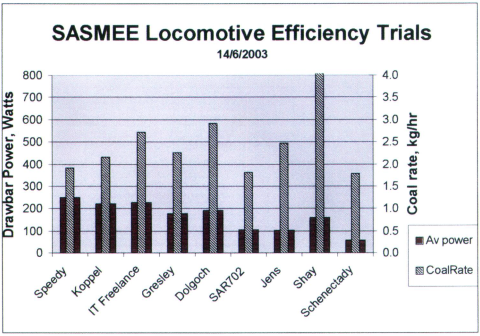


Figure 3

SAR 702 at the head of the test train. The dynamometer car is the scale carriage immediately behind the tender.

Owner	Loco	Wheels	Gauge inches	Trip time mins	Distance m	MaxForce Newtons	MaxPowe Watts	MaxSpeed kph
Allan Wallace	**Speedy**	0-6-0T	5	31.4	4904	175	467	15.0
Bob Nash	**Koppel**	0-6-0	7.25	30.5	4904	233	613	14.1
Ian Thomas	**IT Freelance**	4-6-2	7.25	32.4	5747	237	632	15.1
Bryan Homann	**Gresley**	2-8-0	5	31.9	5559	179	537	17.6
Barry Dunstan	**Dolgoch**	0-4-0	7.25	30.9	5559	231	649	17.3
Bob Smith	**SAR702**	2-8-2	5	32.6	4581	134	322	13.9
Bill Coles	**Jens**	0-4-0	7.25	30.2	4904	105	256	13.5
Graham Driscoll	**Shay**	4 truck	7.25	29.6	5235	128	357	14.9
John Beal	**Schenectady**	0-6-0T	5	33.7	3596	93	148	12.2

Figure 4

consumed. This is a sure sign that *Koppel's* train was far too light to give it a proper run. At the other extreme, *Speedy* was working quite hard, and burnt about twice the mass of coal in her fire.

Drivers were directed to start with a full firebox, then refill with weighed coal to the same level at the end of the run. In most cases, the engines steamed so hard under the steady conditions that it was impossible to prevent significant steam loss from the safety valves. In these engines it would have been better to start and end with a lower level of fire. Of course, it is even more difficult to judge a partial refill!

Driving technique is a significant factor in the results and we all noted how our engines were different to drive under sustained non-stop conditions. We have developed our techniques and our engines to perform on field days, rather than for efficiency trials. In these unfamiliar circumstances I am sure we do not see the true potential of the engines, and some experience and practise will increase the measured efficiencies.

The winning loco

I always intended to briefly describe the winning locomotive, and feel mildly self-conscious that it was mine. I trust that this section won't be seen as indulgence on my part!

Speedy was designed by LBSC and took 600 hours over a period of 3 years to build. The valve gear and motion details were closely based on K N Harris's redesign. She is featured on page 30 of *AME* issue 109.

There are needle roller bearings in the axleboxes, running on case-hardened axles. The cylinders ($1^5/_8$" bore x $2^1/_8$" stroke) are bronze with plain stainless steel piston valve bobbins, without rings, according to LBSC's practice. The pistons have two adjacent packing grooves, one with graphited yarn and the other with a Viton O ring.

The boiler is copper, with a screw-type regulator. Superheat is very high, with five stainless steel elements projecting right through the firebox for maximum radiant heat input. The grate is in cast iron and has a 50/50 gap/bar ratio at ¼" pitch.

I sleeved down the axle pump to a displacement ratio of 1:256 with the cylinder displacement. This is less than half the designed displacement but it still has more than ample capacity. There is an injector fitted, which I rarely use.

There is a turbo generator fitted under the footplate, with a toroidal (zero magnetic cogging) armature.

According to the dynamometer car, her maximum output at the drawbar exceeds 500 watts, but at an average power of 250 watts she can be notched up for more efficient expansive running.

Thanks to the committee, the helpers and the drivers for helping make this an enjoyable and instructive day. We all think we will do better next year!

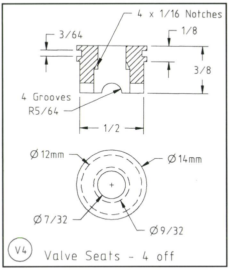
Loco	Av power Watts	AvSpeed kph	CoalRate kg/hr	Thermal Effy, %	Driver load?
Speedy	249	9.4	1.91	1.56	No
Koppel	219	9.7	2.16	1.22	Yes
IT Freelance	227	10.7	2.72	1.00	Yes
Gresley	178	10.3	2.26	0.94	No
Dolgoch	190	11.0	2.91	0.78	Yes
SAR702	105	8.5	1.80	0.70	Yes
Jens	102	9.7	2.46	0.50	Yes
Shay	157	10.7	4.05	0.47	Yes
Schenectady	57	6.4	1.78	0.39	Yes

Figure 5

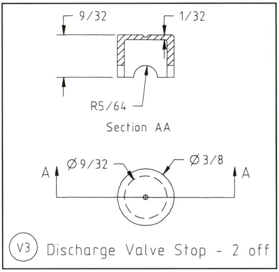
A Small Weir Type Stationary Boiler Feed Pump, circa 1885 — part 3

by Peter Lukey

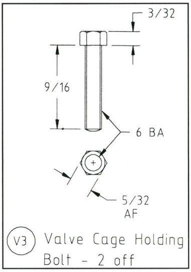
Drawings for publication from author's originals by Peter Manning, photos by Brian Carter unless otherwise credited



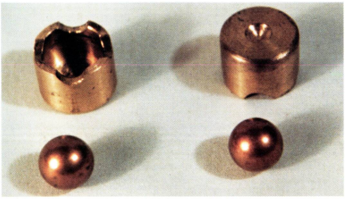
Valve Seats - 4 off



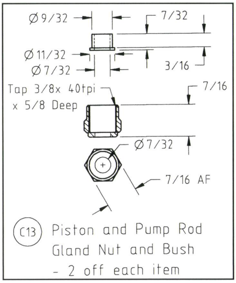
Discharge Valve Stop - 2 off



Valve Cage Holding Bolt - 2 off



The valve seats are a straight forward machining job. Use hard brass if bronze balls are to be fitted, or use bronze if stainless steel balls are to be used. All four (4) seats are identical. The 'O' ring groove is the important feature, the depth should be such that the 'O' ring has 0.005" 'pinch' against the valve body wall.



Piston and Pump Rod Gland Nut and Bush - 2 off each item

The top valve cage has a dimple in the top for the centre holding down bolt in the cover to locate the cage.

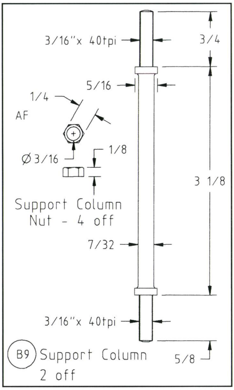
The final parts to complete the cylinder and pump assemblies are the packing bushes and the gland nuts. Concentricity is needed to prevent binding.

The two tie rods between the steam cylinder and the pump body can be mild steel or stainless steel. I made them out of mild steel as they are going to be painted. The important dimension is the length over the shoulders. This must be exact for both tie rods, otherwise the pump will bind.

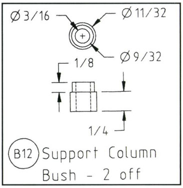
The pump piston rod assembly is made of four (4) parts; steam piston, piston rod, pump 'bucket' and retaining nut. The steam piston is machined to size except for the outside diameter and the 'O' ring groove inner diameter. Leave these 0.010"—0.015" oversize. The piston rod is machined next using a split bush or collet to get the reduced section concentric. The threads need to be a good fit but not binding.

Fit the steam piston to the piston rod so the top face of the piston is flush with the rod end.

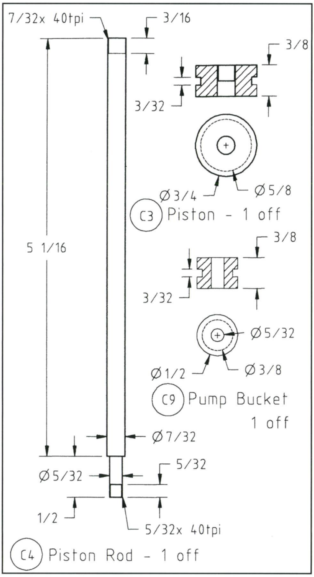
Put the piston rod back in the split bush or collet and turn the piston diameter

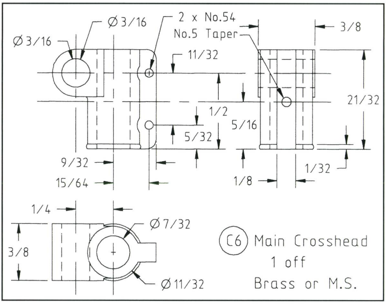


Support Column 2 off



Support Column Bush - 2 off





down to a sliding fit in the steam cylinder. Deepen the 'O' ring groove until the correct fit is achieved (approximately 0.005" pinch).

Turn up the pump 'bucket' to size except for the outside diameter and the 'O' ring groove inner diameter. Leave these 0.010" - 0.015" oversize.

Mount the pump 'bucket' on a stub mandrel that is a stiff fit in the bore.

Turn down the outside diameter of the pump 'bucket' to a sliding fit in the pump, then deepen the 'O' ring groove until the correct fit is achieved (approximately 0.005" pinch).

Make a trial assembly. If all is well the piston rod assembly should slide up and down and be rotated at any point in the stroke without binding. If binding occurs take off parts, one at a time, to find the source of the stiffness and correct before proceeding.

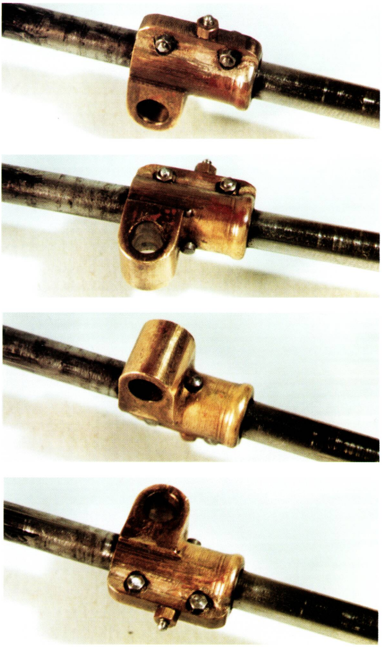
When all is well, try the assembly again with the 'O' ring fitted. Put a smear of silicone grease on the 'O' rings before snapping them into their grooves.

The piston rod assembly should be stiffer but definitely not tight.

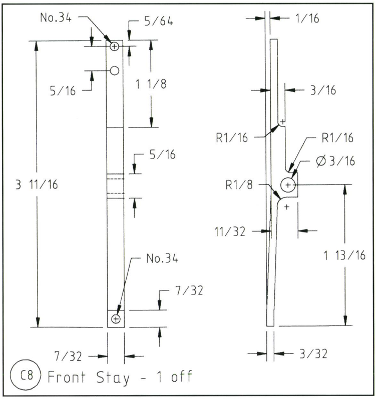
The valve gear parts are made next, starting with the main crosshead. This can be made from yellow brass or mild steel in 2 parts, which are silver brazed together.

Machine the circular part of the main body from a rectangular piece $^3/_8$" x $^5/_8$" and ream the bore for the piston rod.

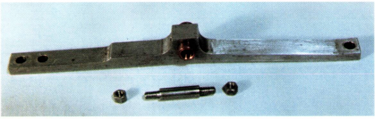
I racked the semi circular section behind the crosshead



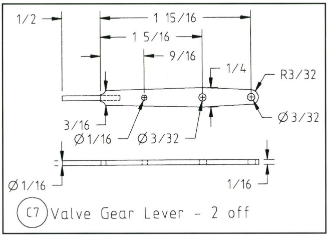
Four views of the main crosshead



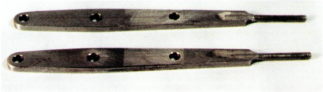
C8 Front Stay - 1 off



Front stay and pin



C7 Valve Gear Lever - 2 off



Valve gear levers

pin boss with a tool set sideways in the toolpost. This surface was cleaned up later with needle files.

Whilst the crosshead is still on the stock, endmill the slot for the 'clamp' lug on the front of the crosshead. Also, drill and ream for the crosshead pin. Part or saw off the crosshead from the stock and clean up the top face on a stub mandrel. File around the crosshead pinhole using filing buttons to ensure a central hole.

File up the clamp lug and silver braze this into the crosshead. Clean up and fit 2 x 12 BA hex bolts through the 'clamp' lug to imitate its purpose. Do not fit the crosshead to the piston rod yet with the taper pin. Leave this until other parts of the valve gear are completed.

The front stay is made from mild steel plate. Although 7/32" is indicated on the drawing, black 6mm flat is quite satisfactory. When cleaned off it is near enough to size.

Remove the steam chest assembly from its wrapping and fit it to the steam cylinder. Check the difference in height of the two mounting pads and mark out the rest of the stay from these surfaces. Ensure that the cross hole is square to the bolting faces and square to the side face. Drill the mounting holes and attach the stay to the pump body mounting boss. Spot through the top holes into the pad on the steam chest cover with the steam chest in place. Disassemble the stay and the steam chest cover. Drill and tap the pad on the steam chest cover, clean and reassemble with the steam chest. Pack the steam chest assembly away again to keep it clean.

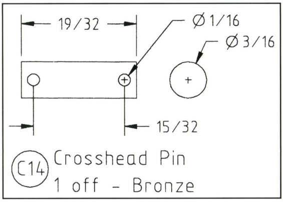
The crosshead pin is made of bronze if the crosshead is steel or steel if the crosshead is bronze. The cross holes for the valve gear lever arms are best drilled in a jig as they must be parallel and correct centres so as not to bind.

The valve gear levers are a pair and the holes for the pivot and spacers should be drilled with the levers clamped together. Drill the end holes in the 4-jaw chuck with packing on either side of the lever as the drill will just break the side faces. The lever pins are 1/16" diameter silver steel sweated into the levers with 965 alloy. The levers could be made of stainless steel rather than mild steel if preferred, 965 alloy will successfully soft solder stainless steel.

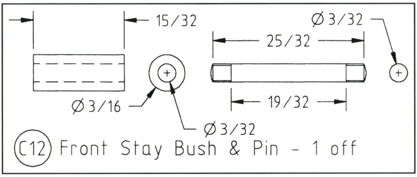
The lever spacers and valve crosshead need little description. The valve crosshead is bronze and the cross hole must be central and square.

The valve spindle joint is made from ¼" diameter bright mild steel. Mill the tongue and slot on the ends of two pieces of rod and temporarily solder the joint together. Machine the pair as one piece. Drill and tap for the pilot valve spindle and the lower valve spindle. Cross drill the joint and ream out with a No 5/0 taper pin reamer.

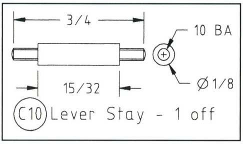
Separate the two parts and clean off the solder. Ream

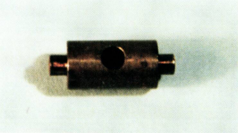


C14 Crosshead Pin
1 off - Bronze



C12 Front Stay Bush & Pin - 1 off



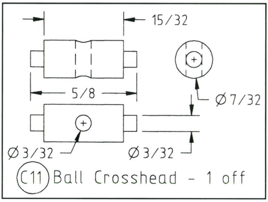


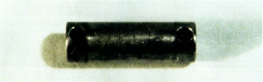
Ball crosshead

the tongue out a fraction more. Radius the ends of the tongue and fork until about 10° movement is achieved when the two parts are assembled on a No 5/0 taper pin. Trim the pin and round the ends so they just protrude from the joint. An alternative to the taper pin would be to fit a $^1/_{16}$" roll pin tight in the fork and clear in the tongue. Ensure the roll pin slot faces across the join so there is a complete bearing on the pin vertically.

Trim the upper valve spindle to length and thread the end. Make up the lower valve spindle and fit a pair of locknuts to the thread. These are used to adjust the travel of the pilot valve which in turn set the travel of the piston rod.

To be concluded ...





Crosshead pin

Australian Model Engineering

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#57	Nov-Dec	1994	$6.50
#58	Jan-Feb	1995	$6.50
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#61	July-August	1995	$6.50
#62	Sept-Oct	1995	$6.50
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#64	Jan-Feb	1996	$7.50
#65	March-April	1996	$7.50
#66	May-June	1996	$7.50
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#68	Sept-Oct	1996	$7.50
#69	Nov-Dec	1996	$7.50
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#71	March-April	1997	$7.50
#72	May-June	1997	$7.50
#73	July-August	1997	$7.50
#74	Sept-Oct	1997	$7.50
#75	Nov-Dec	1997	$7.50
#76	Jan-Feb	1998	$7.50
#77	March-April	1998	$7.50
#78	May-June	1998	$7.50
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#81	Nov-Dec	1998	$7.50
#82	Jan-Feb	1999	$7.50
#83	March-April	1999	$7.50
#84	May-June	1999	$7.50
#85	July-August	1999	$7.50
#86	Sept-Oct	1999	$7.50
#87	Nov-Dec	1999	$7.50
#88	Jan-Feb	2000	$7.50
#89	March-April	2000	$7.50
#90	May-June	2000	$7.50
#91	July-August	2000	$7.50
#92	Sept-Oct	2000	$7.50
#93	Nov-Dec	2000	$7.50
#94	Jan-Feb	2001	$7.50
#95	March-April	2001	$7.50
#96	May-June	2001	$7.50
#97	July-August	2001	$7.50
#98	Sept-Oct	2001	$7.50
#99	Nov-Dec	2001	$7.50
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Maryborough Revisited

by Dave Harper

The great thing about all the correspondents I've acquired through *AME* is that I never know quite where our common interests will lead me. A case in point is the Mill Engine query that I put a while ago in reference to the piston tail-rods on some engines.

One of the respondents to my query was Jim Crane who is a retired design draughtsman from Walkers in Maryborough. Apart from being uniquely qualified to comment on the question at hand, Jim mentioned in passing that in his retirement he was one of the drivers of *Mary Ann*, the replica of the first steam loco that Walkers built, which now runs as a tourist attraction in Maryborough.

As longtime readers may recall, back in 1995 I spent a very pleasant few days in Maryborough where I was privileged to meet Peter Olds and to see his foundry and attached museum. Peter also took me to see the Maryborough Sugar Mill where I was able to photograph the last of the reciprocating steam engines in action. That was a thrill and a half!

Not only that but I was able to meet all the stalwarts of MELSA who made me very welcome on their running day in Queen's Park. This was all recorded in *Maryborough Odyssey*, in Issue 63, Nov/Dec 1995. *(Our editor's recently completed Index makes looking these things up a breeze!)*

So, when Jim invited me to visit him and see *Mary Ann* in action it wasn't a hard invitation to accept. It was early May 2003 when I finally arranged this trip. I took along my long-time friend Kel Ayling, himself a driver of vintage steam locos with the QPSR and ANGRMS groups here in Brisbane. We decided to make it a leisurely trip, driving up on a Wednesday, staying a couple of nights in Maryborough so we could see *Mary Ann* and crew on their Thursday running, then come home on the Friday.

The whole trip worked out great, the weather was fine apart from a few showers, and we were able to meet and ride with *Mary Ann* and crew as well as catch up with Peter Olds and his brother Bill and see what was going on at the foundry.

I'll let the photos tell the story, as our Thursday unfolded — we arrived at the old Maryborough Station around 7am to see Mary Ann prepared for the day's running. Entry to the goods yard was past the sign in **photo 1** which neatly shows Walker's involvement in Queensland's railway development! We discovered that *Mary Ann* is stabled in a fenced off area of the goods shed. To move her out a compressor was fired up and she was given a boiler full of compressed air — pretty neat! **Photo 2** shows *Mary Ann* emerging from the shed under air power. Note the high-visibility gear worn by all the crew, and Kel and me! That's Kel on the right.

Photo 1

Photo 3

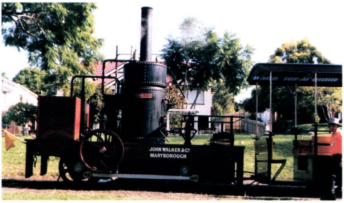


Photo 4

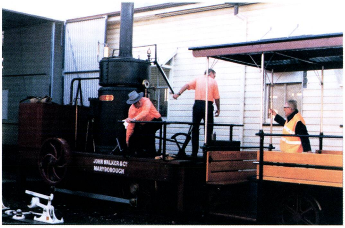


Photo 2

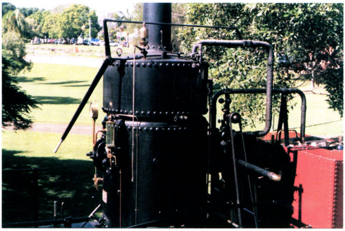


Photo 5

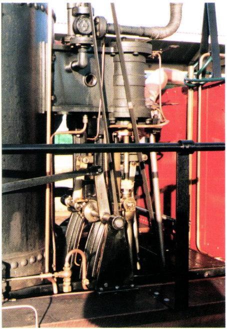


Photo 6

Photo 8

Photo 10

Once out in the morning sun the crew set about firing and oiling the loco, and Kel and I had a chance to study this very different engine. **Photo 3**. At this distance in time I'm not sure who is who in the pictures, so I'd better not risk giving names. I'll acknowledge the whole crew by name at the end.

Photo 4 is a good profile of *Mary Ann* and shows just how different she is from the usual steam loco! The twin cylinder engine is mounted in front of the boiler and drives the front axle via a layshaft. The drive can be disconnected by winding the intermediate pinion out of mesh by a long screw and handle. On the original this was arranged so that power could be taken off via a belt on the flywheel to drive a saw for cutting timber and a winch for hauling said timber out of the woods to the engine. A pretty versatile loco!

Photo 5 shows the boiler in more detail, with the regulator lever and valve clearly visible, also the governor and its drive belt — another unusual feature! **Photo 6** shows the engine in more detail, with its Stephenson valve gear very much like a launch engine.

The other side of the engine, **photo 7**, shows the flywheel with the pinion winding gear behind it and the handbrake alongside the boiler.

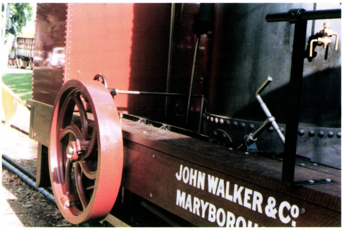


Photo 7

Photo 9

Photo 11

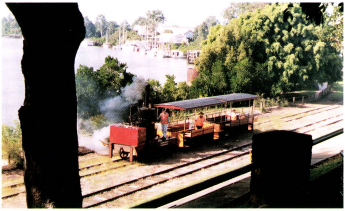


Photo 12

Photo 13

Once all the preparations were complete and we had steam up, a QR shunter came aboard to see us through the maze of points and sidings down to Queen's Park, part way along the siding which runs along by the Mary River to Walkers' factory.

The two delightful passenger carriages hauled by *Mary Ann* were built by Olds and have hydraulic brakes that use boiler pressure for operation, and are fitted out in local timbers. The lead carriage of the day used Kauri pine, locally called Dundathu, as seen in **photos 8 and 9** — I think that's Jim Crane on the left as we headed for Queen's Park. The other carriage is fitted out in Red Gum as far as I recall.

When we reached Queen's Park it was a matter of setting things up and waiting for customers ..... meantime *Mary Ann* simmered gently in the sun, **photo 10**. When some customers turned up I went for the ride along the picturesque way through the park and along by the Mary River — **photo 11**. Hopping off at the far end of the run I came back along the high track and captured the atmospheric shot of *Mary Ann* and train drifting along the river bank (**photo 12**) — it beats the hell out of working for a living!

We'd like to thank the whole crew for their hospitality and friendly welcome. Kel was particularly thrilled at having the chance to drive *Mary Ann*, something he didn't expect. So to Jim Crane, Arch Bisset, Trevor Stapleton, Robert Balfour, Adrian Thompson, Don Reid, Charlie Ferguson and Jenny Jacobsen — thank you for a great experience. It's good to know that Maryborough's heritage is in such good hands!

By about 1pm we'd all had enough and Kel and I left the crew to return *Mary Ann* to her nest while we went into the town for some lunch. Suitably refuelled we found our way to the Olds' establishment and latched onto one of the tours that run during the Thursday open days.

The William Olds & Sons foundry is a long-established business, having been founded by Peter's father in 1918. It is something of an institution in Maryborough, and is now run

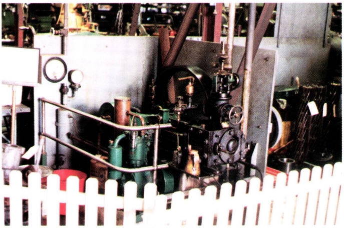


Photo 14

Photo 15

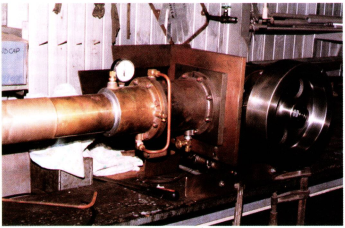


Photo 16

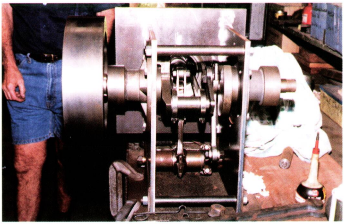


Photo 17

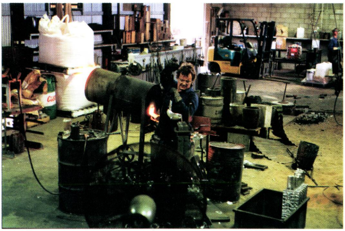


Photo 18

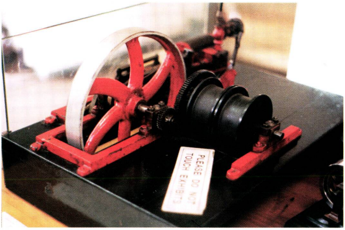


Photo 19

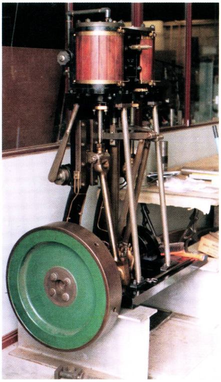


Photo 20

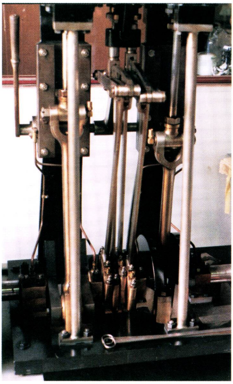


Photo 21

by the third generation, Peter's son Robert. Looking around the showroom in front of the foundry there are numerous examples of incredible patterns made for many different jobs, including a water turbine, and many for castings on QR locos and rolling stock, such as headlamp mounts and luggage rack ends.

One unusual item was the calliope in **photo 13**, which runs on compressed air and is complete with keyboard and a lady that plays it on special occasions!

Passing into the workshop area there is a lovely little Robey horizontal engine that is hooked up to the layshaft to drive several machines each Thursday — **photos 14 and 15.**

Mounted on a bench further back I spied a monster hot-air engine. This turned out to be a 4" bore version of the little ones that Peter has been producing for many years — the little ones have a parabolic reflector that uses solar power to produce a modicum of usable energy. Some folks from Qld University decided it would be neat to have a bigger version that would generate about 1kW of electricity from a bigger reflector, and the engine I saw was the first prototype. It certainly is a pretty solid looking machine. **Photos 16 and 17** give an idea of it's size.

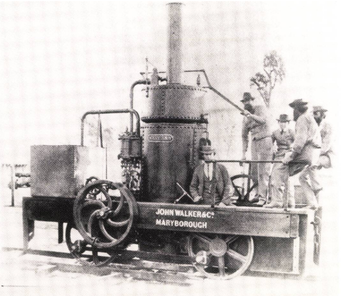
In the foundry behind the workshop visitors stand on a raised walkway to watch the goings on. **Photo 18** shows die-cast aluminium sections for waste bin holders being poured. The furnace behind the workman is fired by natural gas, is ceramic lined and provides a steady flow of molten aluminium into a heated crucible below. The ladle holds just enough for one casting so it's a very efficient operation. Finished sections are visible in the bin, right foreground.

Next on the tour we moved into the little museum at the end of the building where I couldn't resist a picture of the model steam winding engine, one of numerous models on display. **Photo 19**.

Finally, around the far side of the workshop I spotted what turned out to be a complete spare engine for *Mary Ann*. Most modellers make two of everything while they're set up, don't they? **Photos 20 and 21** show what a delightful twin cylinder launch engine it turned into.

It was a great pleasure to catch up with Peter and Bill Olds again, as pleasant and helpful as always! Thank you both and your staff for making our visit so interesting. We'll be back again some day, and can recommend a visit to Maryborough on a Thursday to anyone!

Oh, and in case you are wondering how it compares, here is a shot of the original *Mary Ann*.



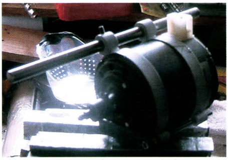
Photograph of *Mary Ann* by EH Forster. Probably taken 30th June 1873 in Bowen Street when being tested on specially laid track. Men on engine right to left: William Sim Jnr, William Sim Snr, Robert Sim, Captain Blue, James Sim Tertius.

Rob's Diesel

A basic narrow gauge battery powered locomotive for 5" gauge

Part 3

by John Campbell



Motor and mounting shaft

Trial run

If you are as keen as I to see the wheels turning you will need a trial run at this stage. A temporary floor can be attached and a 12 volt battery tied on securely. Temporary leads with a switch can be attached to the battery and motors and you can see what you have built. Remember that the motors will be turning in opposite directions and wire up to suit. There will be some wheel slip when switching on but I am sure that you will be pleased with the result.

Couplings

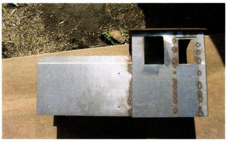
The couplings are not drawn. You can make them to suit yourself. If you are to follow the AALS safety standards you will also need an attachment for a safety chain to hook to your driving car. This I will leave to suit your club's regulations.

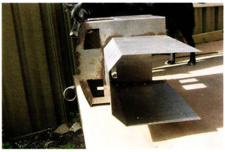
Floor

It is easy to give measurements but in this case it is more important that the floor overlaps about 2mm outside the sides and ends of the buffer beams. The floor is preferably made of sheet steel, about 1.6mm thick being very suitable. A trip to the sheet metal shop will get this cut to size or a look around the scrap man's stock may find something suitable. A valance of 10mm x 10mm steel is riveted to the edge of the floor. The floor will be held by screws through the frame angles.

Cab and bonnet

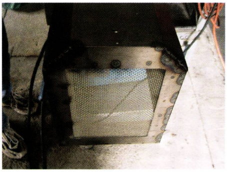
The upper works can also be made of sheet steel a bit thinner than the floor. The pieces for the cab can be cut to size at the sheet metal shop and assembled by welding. The window openings can be cut out with a nibbler in your portable drill or by milling out with a 6mm end mill. Ask around, someone is bound to have a nibbler under his bench. The door is made separately and welded behind the sides. 4mm handrails are either welded in place or attached with nuts inside and out. The roof is rolled to suit. Make it a bit oversize and trim it after rolling. More welding will be needed.

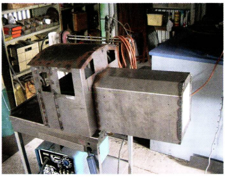




Brass window frames can be added outside the windows or you could cut the window openings to the outer line and place window frames inside the cabin and paint them in a contrasting colour.

Before making the bonnet you should decide on the battery. Obviously you get what you pay for and the size and deep cycle are things to look at. Place the battery on the floor, mark out the necessary cut out in the cab front and design the bonnet to give ample clearance. Again see the sheet, i.e. to cut and fold and then weld together. The radiator insert is an off cut from the screen door maker. The louvres on the sides are stock louvres for kitchen cupboards (Haron, Item 3001B, triple louvre, 300 x 115mm, ours came from Mitre 10) and are attached with screws.





Door handles

These little handles will add a bit more interest for the children who like to see the loco so much. They are cut from 6mm brass, sawn to shape, filed and polished. They are nutted firmly into the doors so that little fingers will not be able to pull them off.

Exhaust cowling

Headlight and horn

The headlight is built around a cheap torch most of which is discarded. The reflector and socket for the globe are what we really need. 12 volt globes are available from electronic parts suppliers.

The "audible warning device" comes from the auto parts shop and even their smallest will be plenty loud enough.

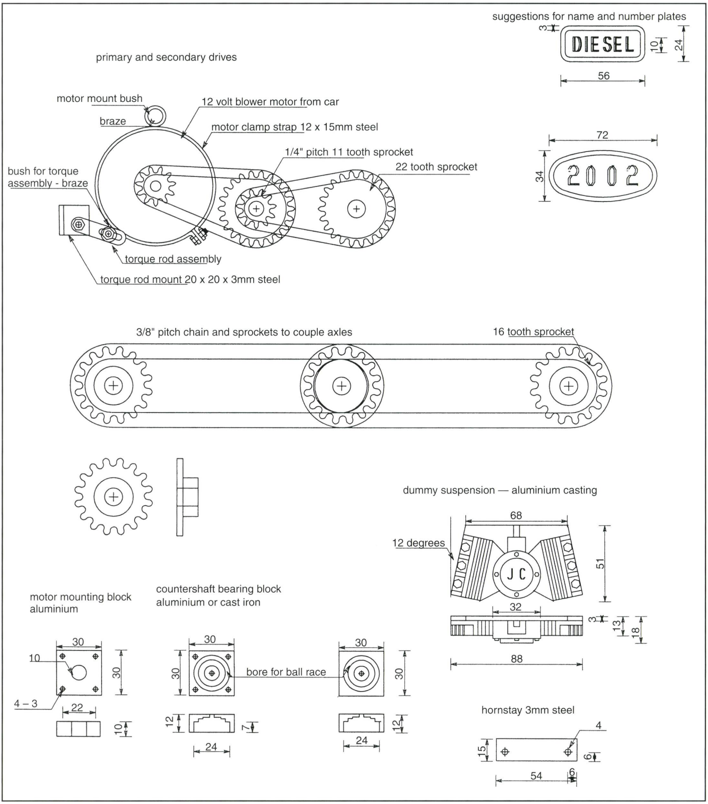
Number plates

The loco will not be complete without the traditional brass name and or number plates. My plates are made up of individually cut out letters or numbers

soft soldered to backing plates. The oval plates for the numbers are made up of two laminations of 1mm brass rivetted together, the back plate and the outer plate with the "window" being left oversize with the rivets out of the way and the final shape cut and filed after the soldering is completed. If you want a nameplate the rectangular back may be recessed by end milling in 2 or 3mm brass plate made over size and trimmed after milling.

Dry transfers are not easy to find now. Numbers and letters appear in print in many places such as the junk mail and the selected figures or letters are superglued to the brass sheet. Any holes needed in the characters are drilled and opened up with small files and the characters are then cut to shape with a fine blade in the bandsaw or with a miniature hacksaw and finished with small files. Use a backing of thin Masonite® while sawing out the numbers and/or letters.

The back plates are lightly tinned and the numbers are sweated into place, pushing them around with a length of wire



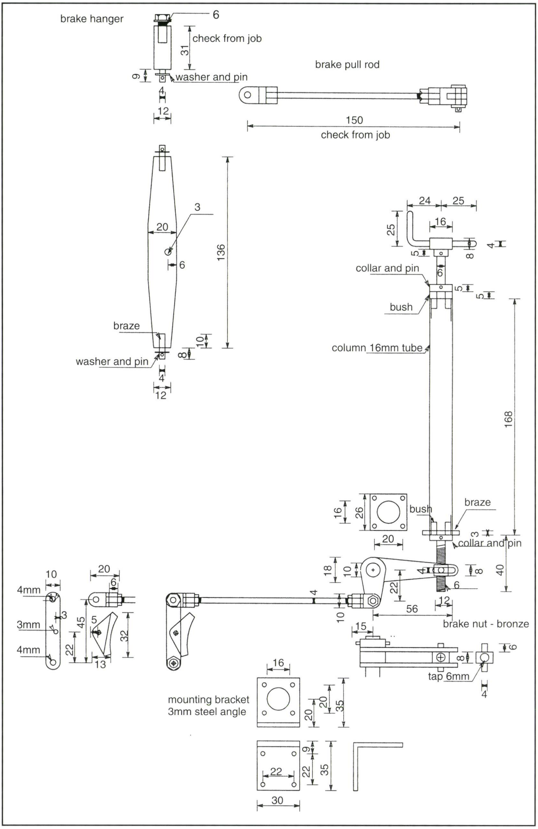
suggestions for name and number plates
3
DIESEL
10
24
56
72
34
2002
primary and secondary drives
motor mount bush
braze
12 volt blower motor from car
motor clamp strap 12 x 15mm steel
1/4" pitch 11 tooth sprocket
22 tooth sprocket
bush for torque assembly - braze
torque rod assembly
torque rod mount 20 x 20 x 3mm steel
3/8" pitch chain and sprockets to couple axles
16 tooth sprocket
dummy suspension — aluminium casting
68
12 degrees
JC
51
32
3
13
18
88
motor mounting block aluminium
countershaft bearing block aluminium or cast iron
30
10
30
4 – 3
22
10
30
30
bore for ball race
30
30
12
7
24
12
24
hornstay 3mm steel
4
15
6
54
6

until you are satisfied with their positioning. The plates are then rubbed down on progressively finer grades of wet and dry paper on a flat surface such as a piece of plate glass or chip board and finally polished by rubbing them on a cloth on the flat surface using Brasso® or some similar product. Two mounting holes are drilled tapping size (10BA) through each plate. The recessed back of the plate is painted the colour of your choice. The plates are positioned on the body and holes are drilled through the sides. The holes in the body are opened out to clearing size and the plates are tapped for the screws. The plates are mounted with short screws and the exposed ends of the screws are touched up with paint.

Controller

A step resistor controller like I made for the tram could be built up but an electronic controller is more appropriate for this loco. You can build your own or put the hard word on a friend to make one while the 4QD controller seems to be the Rolls Royce and worth the money. Graeme feels that although the 4QD gives great control some of the fun and involvement in driving is missing. Don't forget a circuit breaker near the battery. The main battery and motor wiring should be capable of carrying 25 amperes and may be bought at an auto parts shop while the wires to the headlight and horn may be much lighter.

Since I built my tram many of the items I bought at Tandy are not available so you may have to do some searching. We found a better reversing switch at Autobahn. I think that a key switch in the control circuit is advisable and a relay may be needed to handle the current. It would be a good idea to place a battery charging plug somewhere easily accessible in the upper works.



Brakes

I have not fitted brakes to my trams relying on the hand brake on the driving car for service stops. A hand brake would be useful at times for parking and drawings are included. There is little room around the usual position for the brake gear and brakes on the back axle only are probably sufficient. I have had thoughts of adding a small 12 volt compressor which might be used as an exhauster for vacuum brakes on the driving car and train. You can be the experimenter here and tell us of your results.

Painting

Finishing off is done with auto body fillers and putty. Painting is probably done best with auto aerosol primer and finishing coats. The colour is entirely up to you but a bright colour is probably most appropriate. Robert's loco is bright orange and is certainly easy to spot.

Conclusion

I think that this completes the project. Robert's locomotive was completed to take to Wagga Wagga in 2001, just under twelve months after designing started. He had a very satisfying run at the start of the weekend until the electronic controller failed. He has since had several good outings with his loco. The real reward for all your efforts in building and running the loco comes from the expressions of surprise and pleasure in the eyes of small children who come to ride at your track.

I am sure that you will receive as much pleasure as I have from this project.

Wayne Roberts of **Model Engineering Supplies** can supply the components to build this locomotive. Give him a call on (03) 9338 7368.

The end result — an attractive loco for the young ones to drive (or the not so young)

Rogers K88 *Washington*

The remarkable story of an historic New Zealand steam locomotive

By Dave Giles

In the 1870s Alison D Smith, the Locomotive Engineer for the New Zealand Railways, believed that American locomotives were more suited to New Zealand conditions than any which came from Great Britain. Consequently an order was placed with the Rogers Locomotive Works, Paterson, New Jersey for eight 2-4-2 express locomotives. They were to become the 'K' class and the first American locomotives to run in New Zealand. The first two were built in 1877 and named *Washington* and *Lincoln*. The remaining six were supplied the following year.

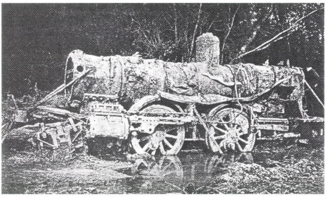
The beautiful Rogers K88 locomotive *Washington* started its life hauling mainline daily express passenger trains between Christchurch and Dunedin. At times it was also rostered on the *Kingston Flyer* to boost tourist passenger numbers into the Queenstown, Southern Lakes district and Central Otago areas and ever since the Rogers K has been synonymous with the *Kingston Flyer*. *Washington* quickly became a favourite with the drivers as it could easily run at 50 mph.

By the end of 1924 it was retired and, along with a dozen other worn out locomotives, was dumped into the Oreti River in Southland to protect a railway embankment from erosion.

Restoration

Forty seven years later, in 1972 a group of steam enthusiasts, led by Bob Anderson from Ashburton, found the wreckage of K88 and proceeded to exhume it from its muddy grave. The locomotive was a total wreck. The remains were taken by truck to the Plains Railway in Ashburton and over a period of 10 years, piece by piece, the rusted and worn out hulk was stripped, cleaned, repaired and re-assembled back into a working locomotive.

The boiler passed a safety inspection and was issued a ticket, but after 5 years of service it was condemned. Sadly, Bob Anderson passed away and the K88 project stalled for a while.



The sad state of K88 as removed from the Oreti River

In 1990 a resurgence of interest saw John French lead a team at the Plains Railway into a new era of fundraising to carry on where Bob Anderson had finished. Now with a much larger budget, a new boiler was designed and ordered, and much of the previous rebuild was re-done with a lot of new components being cast and machined to bring the locomotive up to 'A' grade mechanical condition. The original K88 tender bogies and frame were finally located in the river in 1995. These have now been fully rebuilt and reunited with the locomotive. *Washington* was steamed again in mid 2002 and is now in pristine condition in all respects. Amazing!

Charter for a day

Late in November 2002 I discovered that we were able to charter K88 for a full day which meshed in perfectly with a trip we had already planned around the South Island. Wow! An e-mail flyer was made up to invite all my live steam friends to come and share this historic day riding on and enjoying one of the most famous locomotives ever to operate in New Zealand. The response was immediate with dozens of replies from people wanting to join in the fun at Ashburton on 3 January 2003.

The day before, on January 2, the day before, we arrived at the Plains Vintage Railway at Tinwald (near Ashburton) and met with the trustees of K88, having a chat over a few bags of potatoes they had just dug and bagged. You may well ask what potatoes have to do with restoring and running historic locomotives. The Plains Vintage Railway lease land adjacent to their line and farm it to raise funds. They grow potatoes, peas, oats, barley, etc. and harvest the crops using restored vintage farm equipment towed behind vintage tractors and steam traction engines. The cash flow gained from the farm operation is used towards financing the restoration and rebuilding of the railway equipment owned by the trust. These guys work really hard six days a week!

Charter coordinator, Dennis Harris gave me the initiation tour and I was

K88 is she is now — a fantastic work of restoration
Photo: Mike Orange

introduced to John French, the loco foreman. As mentioned, John has been the driving force behind the recent total 'A' grade rebuild of K88. Overalls were soon the order of the day and a full inspection was carried out underneath the loco and tender. We made some brake adjustments and attended to other minor servicing chores. Water levels were checked in the tender tank and loco boiler and a small fire was lit in the firebox. Three hours later we had 120 psi of steam, enough to test the operation of the Westinghouse air brakes. All was well with the brake test so we dropped the fire and retired for the day to have a trip on one of the hand operated track inspection 'jiggers'. This was hard work and it was soon very apparent that the motorized inspection 'jigger' was the way to go so we opted to ride on that for the track inspection tour.

The big day

All the crew were on deck at the loco shed at 0730 am. The locomotive was still warm from the previous evening's light up. Another fire was lit and while steam was being raised a full service was carried out on all moving components. Several tins of Brasso® and polishing cloths were then handed around and the big polish-up started — boiler bands, domes, cylinder covers and the *ROGERS* and *WASHINGTON* name plates. K88 looked a real treat by the time a full head of steam was raised and it was ready for the first trip at 10 am. Live steamers and friends from all over New Zealand had now arrived to enjoy this day of fun with K88.

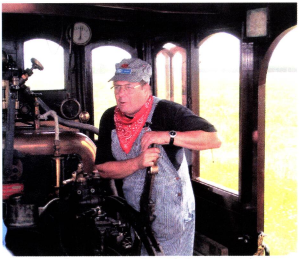
John French eased the locomotive out from its newly built storage depot and over to the rolling stock barn where the restored carriage and guards van were housed. The train was coupled up, brakes were charged and we were on our way for the day.

At last it was my turn at the controls. I felt quite at home with the throttle, reversing lever, drain cocks, blower and all the other controls as, after all, my *Phantom* loco cab layout was based on a Rogers mogul. The Westinghouse train brake took a bit of getting the feel for. It took a few practice trial runs before I could bring the train to a smooth halt without spilling the coffee. Tony Marino and Mike Orange were my firemen for the day. Adam, a regular fireman at the Plains Railway, was coaching them on the finer points of managing the boiler. The new boiler on K88 was easy on fuel and steamed well.

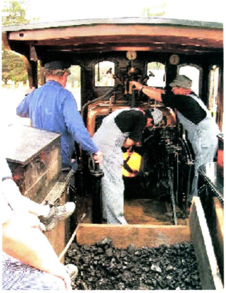
Foam squabs were placed around the tender water tank to enable 10 passengers to ride on the tender with their feet in the coal bunker. These seats were full of smiling camera clicking people, every trip, all day. A fabulous lunch was provided by local caterers for those who had registered for lunch and it had all the trimmings, including fruit salad and pavlova.

On the last trip of the day the chief said to 'open her up a bit more' so I gave the throttle another notch and pulled the reversing lever another notch nearer to the centre. *Washington* scampered along the 3km straight track with sharp square beats emitting from her stack, riding smoothly and sounding just wonderful.

This was the best day I have ever had operating a live steam loco and it won't be the last one with K88. Another charter has been booked for 28 January 2004 for the benefit of friends and visitors who will be attending the convention in Hamilton and then touring NZ.

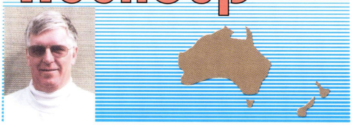


The author comes to grips with the reversing lever



Just about ready for the road

Club Roundup



with Gerardus

Adelaide, SA

Railway Park has gradually developed, over many years, from nothing more than a vacant block of land into what has become an integrated railway system located in a landscaped environment. From time to time, some members have diversified their modelling skills into areas other that steam locomotives: there has been a proliferation of rolling stock, traction engines, a steam crane and various stationery steam engines built. Past member, Don Osborne, built a replica of a water wheel, similar to those used for pumping water out of mines. This model is now located in a prominent position adjacent to the railway sidings and is passed by trains on their way around the Park. The installation of the wheel has prompted an interest in the development of other types of buildings and to date, quite a few models of line side features have been produced, which add interest to the area.

Adelaide Miniature Steam Railway Soc.
Location*: 370 Regency Road, Prospect*
Public Running*: 4th Sunday*

Auckland, NZ

The recent Auction of bits and pieces gifted to the club from the Steve Berkley estate raised a reasonable sum of money which the members felt should go to Steve's children to assist in their education.

In the Bits and Pieces segment of the June meeting, was a $1\frac{3}{4}$" g. model of a Garratt, about 2' long, constructed by Geoff Hallam from a kit. It is a radio controlled, steam-powered model fired by propane. Geoff has a garden railway with a number of small engines either completed or under construction. The next item was a small spirit-fired steam boiler and oscillating engine that was found on a shelf covered in dust: unfortunately the small spirit burner is missing. Bruce Piggott had a steel Briggs boiler, built by his father some years ago, which was inspected with the club endoscope probe. Apart from slight surface corrosion inside, the boiler was pronounced OK. Dave Russell, a *Beejax* builder, showed us his new steam manifold and lubricator sight glass assemblies.

Auckland Society of Model Engineers
Location*: Petersen Road Reserve, Waipuna Road, Panmure*
Public Running*: Every Sunday*
www.asme.org.nz

Balcatta, WA

With the weather looking ominous, the July run day looked as though a repeat of June was on the cards, but for once, we did not get a drop of rain. Overall it turned out to be an excellent day with good patronage, including a Birthday party in the Rotunda. Steve Reeves' *Helen* made a return to the tracks, looking beautiful with her new paint and performed very well. *Speedy* did its thing with Ed Brown in charge. At one stage, we had six trains in action which included *Waratah* for members' training. John Hudson made his maiden drive at last on *Waratah* and he couldn't get the smile off his face for some time. Andrew Manning's Foden truck did a lot of work and took some of the pressure from the trains, providing a nice addition to our attractions.

Discussed at the July meeting, was the labelling requirements for the riding cars. To comply with AS-3533, riding cars must have a label providing the following details: Manufacturer's name, model number (if appropriate) and serial number. For the bits and pieces, Milton Smith showed his 5" gauge tender for his modified *Simplex* loco, complete with part finished steel carrying case. Phil Gibbons showed his recently completed Quorn tool and cutter grinder.

Northern Districts Model Eng. Soc
Location*: Vasto Place, Balcatta*
Public Running*: Last Sunday*
www4.tpg.com.au/users/jimclark

Ballarat, Vic

Track laying on the $7\frac{1}{4}$ and 5 inch track has progressed well since the last update. The steaming bays have been worked out and are now planned to be constructed soon. Work on the smaller 5 and $3\frac{1}{2}$ inch track has commenced and will progress when time permits. Our Annual General Meeting was held at the club rooms at Invermay in July and the new board elected are Terry Armstrong - President, Bill Singleton - Vice President, Noel Voss - Secretary and Erik Hagen - Treasurer

Contact can be made to the club through the Treasurer's e-mail site on steamers@netconnect.com.au

As always visitors and interested persons (especially prospective members) will always be welcomed at our club meeting on the fourth Monday of the month in our Invermay club rooms, and our present working bees on the second and fourth Saturdays of the month.

Ballarat Society of Model Engineers
Location*: Invermay Sports Complex, cnr Muscatel St & Swindlers Road, Invernay*
Public Running*: None yet*

Bulla, Vic

President Alf Bond welcomed a large gathering at this years' AGM. He gave the traditional speech, mentioning that one only has to look around to see the tremendous amount of work that has been done in just over 5 years at the Bulla Hill site by a small number of people.

In the station area the environmental septic system has been installed, and laying tiles is in progress, with painting to follow. The station cannot operate until the fencing which protects the public is erected, and the posts and panels for these have been procured, drilled and painted, with half the area completed.

The components of the bridge to give access to our private picnic area are ready and waiting the foundation work. September/October is the best time to do this, but due to the problems of 'floating soil' the price for this work (not included in our grant) has increased to almost four times the expected amount. The bridge has a 40' span and weighs in at $3\frac{1}{2}$ tonnes.

The Wednesday boys have been busy overhauling and repairing the steam loco's and making post and rails for our various track crossings which are now in place. Four bench seats have been refurbished and painted for the station.

The major leak to the Clubroom roof has been repaired temporarily, but a new roof will be required in the near future.

The annual track inspection has been carried out and (hooray) the list of necessary work is about one sixth of last year.

Our diesels are being fitted with speedo's, which is quite a job, being fiddly and requiring some heavy lifting. An alternative suggestion was the use of a GPS unit. These little gadgets cost around $140, but a trial run proved them very effective.

The public arrive and leave earlier during the winter months, so everyone on Roster duty has been asked to arrive an hour earlier to take advantage of this situation. If this is successful it is envisaged that our operating hours will change to reflect daylight savings time.

With the completion of our four large projects (station, picnic area, bridge and completion of the $3\frac{1}{2}$"-5" track) expected by the end of the year we are reviewing and preparing plans for the future.

We have been asked by our ISP to change our web address to:

http://users.netconnect.com.au/~tlss

Tullamarine Live Steam Society
Location*: 15 Green Street, Bulla*
Public Running*: 1st & 3rd Sundays*

Burnaby, BC Canada

Everybody had a great time during our Trainfest, held in early August. Saturday morning saw passengers coming in at double the normal rate for an average day. During the afternoon, the rain moved in and everything came to a stop. Even so, we carried about 500 passengers. Sunday was a clear day, which saw trains fully loaded: approximately 1100 passengers were carried for the day.

On the weekend of August 16 and 17 we had an exhibit at Science World. We took down 20 feet of our straight portable track and Walter Pruden's Canadian #374 steam locomotive. A filter and air line hooked to the building's compressed air system enabled us to blow the whistle and to run the locomotive back and forth to demonstrate its' working. A large sign and a video player promoted our site, whilst other signs showed the internal workings of steam locomotives. Loads of people came by to learn about how a steam locomotive works and about our society. The weekend was a great success.

British Columbia Soc. of Model Engineers

***Location**: Rainbow Creek Station, 120 Nth Willingdon Ave, Burnaby, BC.*

***Public Running**: Saturday, Sunday & public holidays, Easter to Thanksgiving*

Casino, NSW

At the AGM in August all positions and appointments were re-elected as per last year. Congratulations to all for their efforts in governing the society through another year.

The vote for and against the Proposal to change the society's name resulted in a resounding NO vote. Our name remains The Pacific Coast Railway Society Inc. — Casino Mini Railway.

Pacific Coast Railway Society Inc.

***Location**: Cnr Queensland Road and West St, Casino*

***Public Running**: Every Sunday*

www.casinominirail.com/

Eltham, Vic

Fitting out of the "B" Relay Room Building with 240v power and lighting has been completed and work continues on wall installations, krone block and MDF mountings together with many other sundry tasks. The long awaited commencement of construction of the new "B" Signal Box is now a reality and members attending the recent AGM were greeted by a freshly poured slab foundation.

Work on the internal refurbishment of the Diamond Valley Station building is nearing completion with most fittings now installed and painting in progress. Conditions for our ticket sellers will be much more pleasant for the coming summer.

Steam locomotive No.12, a veteran of the Railway, is presently being considered for restoration by the Heritage Subcommittee. A replacement tender has recently been obtained and consideration is being given to the extent of works required to modify the bogies, seating and coal bunker.

The sorting of one half of the rail stack has at last reached ground level to reveal a maze of rabbit burrows. Sorting of rail can now commence and the growing stack of rail from recently replaced panels can be properly stored. Efforts to sell some rail have paid off with the pleasing result that it has gone to a good home and will become part of another miniature railway project.

Diamond Valley Railway Inc

Location: Eltham Lower Park, Main Road, Eltham

Public Running: Every Sun & pub. holiday

http://www.dvr.com.au

Galston, NSW

The 5th of July was our D-Day (Diesel Day) and eighteen non-steam locomotives arrived to enjoy the day's event. It was encouraging to see so many models of Australian prototypes which reflects a very healthy interest in the full size 'models'. States and railway systems represented by the models included:

NSWR: 8122, 44214, 42215, 7306, X212, two 70 class shunters and three railmotors (CPH 'Tin Hare', XPT and 400 class).

CR: DR1, CLP8

QR: *Red Fred* railmotor and trailer car

Qld. Private Systems: Cane loco & Mt. Isa Walkers diesel-hydraulic

TGR: D21 (an ex-Tasmanian 'V' class regauged to 2'6" by Puffing Billy).

There were also three free-lance locos.

A group of approximately 25 members took the opportunity to visit the old Cockatoo Island Dock yards. Member Brian Day, an ex-Dock Yard worker, soon took over from the official guide and presented a more experienced perspective of the yard, rather than the usual spiel about the island's early history. All were rapt with the 'new guide' as was the official one, and much more was learnt about the industrial development.

Brian Day has been appointed as Chief Boiler Inspector to replace Ross Forsyth who, after 12 years in the position, has resigned to work on the 2 Bundaberg Fowlers that he's been building.

It will be our 30th anniversary in October and for the weekend, Alan Fern is organizing the static display of models. The board has decided not to replace the $3^1/_2$" gauge rail in the inner loop when track replacement is undertaken. This means that the Galston track will become 5" gauge exclusively.

Hornsby Model Engineers Co-op Ltd

***Location**: 29 Mid Dural Road, Galston*

***Public Running**: 2nd Sunday*

http://www.sdr.com.au/hmecl/

Gosford, NSW

Allan Fogarty has also been continuing his work on the drains with a further 1.3 cubic metres of concrete being used on this project. Other concrete projects that have been receiving Allan's attention have included the new concrete walkway at the top steaming bay, the concrete pad for the trailer unloading ramp near the top steaming bay, concrete the second unloading ramp in the top steaming bay, add to this the smaller jobs of foundations on the drive and pathways.

Our Birthday Run in August was another great success with five visiting locos from other clubs. *Bluegum*, the $7^1/_4$" gauge from Luddenham, was by far the largest loco we have had on our tracks to date. Some of our members and guests took the opportunity to participate in another area of the hobby that is fairly new to us, this being radio control. At one stage on the Saturday we had two R/C boats cruising Narara Creek a R/C car and a scale model of Panzer Tank running on the shore it did make for good entertainment seeing the tank take aim and pretend to fire at a 421 class. The tank won't actually fire a thing but goes through all the sound effects and even recoils when fired. We had around 35 people stay for dinner on Saturday night and some took the chance to have a night run whilst others sat back and had a chat, all in all a good night. Sunday was a reasonably quiet day that gave us a chance to have a good clean up from the day before and a bit of relaxation time with 5 member's locos running and two visiting locos — another good day.

Central Coast Steam Model Co-op Ltd

***Location**: Lot 10 Showground Rd, Narara*

***Public Running**: 1st Saturday*

Hobart, Tas

Although Hobart had a wet winter, most Saturday running days were well attended. It was a particularly dank evening for our night run and the steam, the sparks and the glow from the fireboxes really gave a warming ambience to the track. Everyone was requested to bring a can of soup along and a wide variety of types appeared, however it was not until afterwards that we were told by the cook they all went into the pot together — there were no complaints and it did the trick.

The Society's original dual gauge elevated track has now been re-commissioned thanks to President Derek and his assistants. Minor work is still to be undertaken but it is a great improvement. General site maintenance continued, which included replacing a part of the boundary fence near the main entrance.

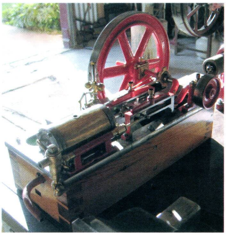
The Society does not conduct public running and besides members' annual subscriptions our only source of income is from the annual fund raising auction. This year's auction was held on a cold, wet Saturday and despite reduced numbers the auction was a great success and our coffers were well added too. Auctioneer Ian Simpson again demanded outrageous bids and it was apparent that several items that had appeared in previous auctions appeared again and will no doubt reappear again in future auctions!

Ex member Robert Lane kindly invited

the Society up to his workshop to learn about the latest techniques in welding. Robert has all the latest equipment and he demonstrated stick and TIG welding techniques to members. It was a great opportunity for those who do not have such equipment normally available to them to have hands on experience. Thanks to Robert's father Graham for organising such a successful visit.

Members will be travelling north to Evandale at the end of September to participate in the Evandale Light Railway and Steam Society's Swap Meet and Invitation Run. It is always a pleasure to travel north and meet fellow model engineers who always make us so welcome. Congratulations are extended to Peter Lawson for being the recipient of this year's Southern Federation Award – well deserved Peter.

As reported in a previous edition of *Club Roundup* the we had the privilege of visiting Keith Redgrove's workshop at Middleton, south of Hobart. Keith is busy building, amongst other things, a 3" Cliff & Bunting traction engine and a 5" gauge *Anne* 0-6-0 tank engine. Of particular interest was a stationary engine built by Keith's great grandfather and grandfather (*photo by David Sommerville*). A very brief history is that it was built prior to 1900 to power a generator Edison light in the family's workshop. Much can be said about its history but its specifications are that it has a stroke of 2³/₄" and a bore of 4" and was powered by a steel boiler 3' high and 1' in diameter. A short, more comprehensive article will be penned for *AME* in the near future.



Email: gnorman@southcom.com.au

Hobart Miniature Steam Locomotive Society Inc
Location: *275 Flagstaff Gully Road, Lindisfarne*
Public Running: *None (members 1st/3rd Sat 1pm)*

Moorabbin, Vic

The July public running day was the best we have had in recent times. This was only achieved by the hard work and co-operation of those present on the day. We have been tackling the difficult job of re-wheeling the elevated track riding trucks. Although the old cast iron wheels had been re-profiled a few years ago, some of them have again acquired interestingly shaped grooves. It is hoped that the new CNC-machined wheels in 40 ton tensile strength steel will be much more resistant to wear and deformation.

Steam Locomotive Society of Victoria
Location: *128 Rowans Road, Moorabbin*
Public Running: *1st Sunday*
www.slsv.com.au

Morphett Vale, SA

Well, another financial year has come to a close and elections for the committee of management was held in July and all past committee members were re-elected unopposed.

The rolling stock co-ordinator Arthur Verral must be congratulated for the past year's work in regard to the reliability of all our club rolling stock and locos. The year has seen the completed order of gondola type cars filled, the fitting of air brakes to every bogie, auto couplers and Snap Lock safety chains to every car. The cars have been given road numbers with bogies stamped accordingly. This allows for a complete record to be kept regarding modification and servicing schedules which is now required by the inspecting engineer.

The GM loco that we purchased from DVR in July 1999 is undergoing a complete drive train rebuild and being converted to hydraulic drive — so if anyone is interested in purchasing a generator and 4 traction motors, contact our club secretary (08) 8362 3269.

The Per Way department under the direction of Karl Hampel have completed one of the busiest years to date. The sub main line was completed and the passing loop brought into operation together with a remote control of switch and signals at "Y" Junction, another project just completed before the end of the year was the extension of the platform tracks at the western end of the of the station, together with new signals and switches. All train and loco movements on public running days are now carried out under the control of the signalman.

The spur line which comes off the sub main line was also completed. This now gives a standing room of 29 metres. This track was a must as there was nowhere to park trains over 15m in length, which we now run. The western end of the station has had the roof extended 10m and now covers all three platform tracks.

Another project that was started was the fitting of plastic planks between and on the outside of the running rails of tracks leading to the arrival platform at the eastern end of the station. Only one track was completed as a trial, which has proved a great success and all tracks outside the concrete platform area will be fitted as money becomes available.

Finally, in the forthcoming year the per way hopes to connect the head shunt track to the loop line to allow for easier handling of long trains, fit a new track diagram to the signal cabin console, install a steel relay cabinet in the lower level, extend the western end of the concrete platform by 8 metres and complete the installation of closed circuit tv.

The Amusement Device Engineer inspected our facility in August and found everything in good order and granted an operating certificate for another year.

Morphett Vale Railway Inc
Location: *Wilfred Taylor Reserve, Wheatsheaf Road, Morphett Vale*
Public Running: *2nd & 4th Sunday*

Mudgee, NSW

At the AGM, the following members were elected to the board: Philip Mattick (President), Ron Roberts (Vice President), Peter King (Secretary) and Lois King (Treasurer).

This year's Blowfly Rally and Birthday Run was not as well-attended as last year due to the wet weather along the NSW coast. There were a number of visiting locos for running and one on display only. It was a challenging weekend for drivers with a number of competitions to test the drivers' skills and keep them on their toes (*better keeping them on the locos…*).

The club has undertaken a number of full-size railmotor trips on the NSW railways and these have proven very popular indeed! Ken Butler has been fencing (not the sword-style) on the approaches to the tunnel bridge — he has also fitted a convex mirror so drivers can see the track ahead, from the cutting on the inner curve, right up to the level crossing. After some initial doubts, drivers now depend on it and feel more confident driving over this section.

Mudgee Miniature Railway
Location: *Cassilis Road, Mudgee*
Public Running: *2nd Sunday, Easter and Wine Festival*

Newcastle, NSW

For our mid-week special runs, we are trying reverse running under the control of Naroo signal box. This has been a great success as we get to use more of our track by running clockwise running and get a fresh perspective of our track.

It was heartening to see so many members support our involvement at Steamfest this year. The portable track was set up to carry the many passengers that availed themselves for a ride over the weekend. It was a great success for our club due to the support, both physical and moral, from our members.

It is rumoured that a certain *brass* engine has suffered an attack by a falling tin of black paint. As a consequence, the loco has now been (shock, horror) painted Descending Black. (*It all takes time, doesn't it, Joe?*)

Lake Macquarie Live Steam Loco Soc Ltd
Location: *off Velinda Street, Edgeworth*
Public Running: *Last Sunday (ex. Dec)*

Perth, WA

Castledare's major focus has been preparation for the 40th Anniversary celebration in October. The main line through the Wilson wetlands has been recommissioned and is back in regular service. Elevated and ground level tracks to the new 5" shed are in place, and progressive repainting of club buildings is in progress. Extensive underground conduiting for the new signalling system is now installed, and associated electrical cabling is in progress. The rolling stock upgrade programme is continuing steadily. Civil engineering works have been performed to ease the formidable 1 in 28 Fern Road bank and make life easier for loco drivers.

The turn-out of members to assist with maintenance has shown an encouraging positive trend recently, and as a result the backlog of tasks is being steadily eaten away. Efforts are underway to re-emphasise the fun and social sides of the club, so that members can enjoy the results of their excellent labours.

Run days continue to be well supported by the public. Whilst Father's Day passenger numbers fell below expectations due to bad weather, the number of trains running was the best for a long time. More new locos are due for completion soon, and some under overhaul are expected back in service. The club also welcomed 4-6-2 *Southern Cross* back on shed after a long stay at Bunbury.

Our club can be contacted via the secretary, Ken Belcher, on (08) 9375 1223, email: skbelcher@wiredcity.com.au

Castledare Miniature Railways of WA Inc
***Location**: Castledare Place, Wilson*
***Public Running**: 1st Sunday*
http://d1565.tripod.com/cmr/

Petone, NZ

At the June AGM, last year's office bearers were re-elected. The July run was cancelled due to a serve cold snap but since then, some of our runs have been very well attended. School holidays have had a definite bearing on this. One of our members has been busy chain drilling the axlebox cut-outs on his 7¼ inch gauge *Phantom* loco. At the August meeting, Murray McKenzie and Ben Calcott passed their safety requirements and now have their driver's tickets – congratulations both!

Hutt Valley Model Engineering Soc. Inc
***Location**: 6 Marine Parade, Petone*
***Public Running**: Every fine Sunday*
www.steammachine.com/hvmes

Salisbury, SA

The trip out around the former wheat field has been enhanced by the number of native trees and shrubs planted, thanks to a grant from the Urban Forest Bio-Diversity Program. We will shortly apply for another grant to enable us to continue our beautification program and plant more trees and shrubs around our grounds.

Our running days have been extremely successful, due in no part to the article written about us by the *Local Messenger* newspaper. Financial assistance generated by the work of canteen staff has allowed us to purchase a forty-foot container which will be adapted into our long-awaited loco shed. It is also planned to hold a twenty-four hour run on the Adelaide Cup Long Weekend in May, next year.

Penfield Model Engineers Society Inc
***Location**: Penfield Ave, Salisbury*
***Public Running**: Last Sunday*
www.picknowl.com.au/homepages/joanlynn/pmesone.htm

Tauranga, NZ

Our Sundays are becoming quite busy with passenger numbers climbing steadily. During the July club night, Trevor Chapman explained the ins and outs of the Track Checker he has built, which is along the lines of a full-size 'twist trolley'. This will measure track twist, cant, etc. and be an invaluable aid in maintaining our track. The club now has ten people who are qualified as Operators, i.e. to be in charge of each day's railway operations. This is a requirement of the rules under which we operate our railway, not to be confused with members having their driver's certificate.

The first Saturday of each month will be a play day at Palmerville, commencing at 11:30. This is a Members and Friends Only day when you can come to the club and run your locomotive or bring your latest project for some constructive advice.

Members donated their time and loaned their models for the Bethlehem College Model Expo. An estimated 5200 visitors passed through the doors and $12,000 was raised for the College: an excellent result!

Tauranga Model Marine and Engineering Club
***Location**: Memorial Park, Tauranga*
***Public Running**: Every Sunday*

Upper Hutt, NZ

June has been a quiet month due to the weather. At the club meeting George Harvey brought in sheet brasswork for the side tanks of his 5" gauge *Simplex* loco. He also brought some carefully made clamps which are used to hold items in alignment on his mill. Cyril Leigh displayed a number of tool holders he made for his Myford lathe while Alan Kemp displayed parts for his 7¼" 0-6-0 *Koppel*.

In the *Blast Pipe* newsletter, it was mentioned that another locomotive has been rescued from an embankment near Bealey bridge, five miles east of Arthur's Pass (NZ). The partly buried bar frames of a 3' 6" gauge loco were re-discovered as far back as the late 1980's but reclamation was not undertaken until 2003! In the meantime, nearby parts of other locos disappeared into river protection works or were taken away for scrap. After eight months of negotiations, permission was granted for the chassis to be dug out and transported to Christchurch for its restoration. The clean mountain air had preserved the steel quite well.

Interestingly, her frame markings, 10-24 1/409 (a Baldwin identification number), proved the loco's identity to be none other than Wellington & Manawatu Railway No. 9, a Baldwin 2-6-2. Not only is she the only surviving loco from this private North Island railway company but is possibly the oldest surviving Prairie from this builder. The loco remains were 111 years old at the time of their salvage.

Maidstone Model Engineering Soc. Inc
***Location**: Maidstone Park, Upper Hutt*
***Public Running**: Every Sun. pm Oct-April*

Warner, Qld

In August we had a successful weekend (code named Track and Tent) whereby AALS affiliated members and clubs visited and enjoyed a weekend of hospitality, friendship, good tucker, plenty of tea and coffee, discussion, enjoyment, and of course running of trains and tractors. There were twelve visiting locomotives, eleven 5" and one 7¼" and 30 visitors for the weekend. The success of this inaugural weekend has prompted us to continue with this concept and so, to all you AALS members, place a note in your diaries for next year when we will have the T&T over Friday and Saturday 6 and 7 August, 2004. The Sunday will be our normal running day but with no official groups. Visitors who wish to stay on to Sunday and run will be most welcome.

Future signalling concepts are now being considered to cater for the added complexities associated with improvements to the track and general maintenance continues as a priority. QSMEE will host the AALS convention on 25-29 March 2005 so place a note in your diaries to attend this event. Details will be forwarded closer to the date. To visit our site, Contact the Secretary, PO Box 322 Everton Park 4053. Note: All persons wishing to run equipment at our site must have AALS Insurance. On behalf of the Committee and Members of QSMEE have a Happy Christmas and may 2004 be good for you all.

Qld Society of Model & Experimental Engineers Inc
***Location**: 122 Warner Road, Strathpine*
Running Day: 2nd Sunday except Dec. by invitation. No public running
www.tracksandtrains.com/qsmee

West Ryde, NSW

After two washed-out running days, the June day was busy indeed. The queues for all the station areas were excessively long and it was standing room only. There were six trains on the elevated track and nine locos on the ground-level track.

Henry Spencer's TGR 'R' Class and Max's *Bitza* hauled one train. Peter Shields' C3901 hauled the second train whilst Ray and Matt Lee double-headed with C3112 and C3506 to provide a service for the whole afternoon. Barry Tulloch's

D5902 double-headed with Jeff Sorensen's C3142T. John Tulloch made this a triple header with 'J' class 2904, a Baldwin loco. 3,252 rides were given on the day. A report from a 'Railfan' states: *"I witnessed the amazing performance of the oil burning 5902 while double heading with 2904 with a massive trailing load. Being a student of locomotive performance trials, I have never before seen such a spectacular firing arrangement as employed on 5902 used anywhere else. Now, I understand the principal of saving energy by intermittent use, e.g. (a flashing rear bicycle lamp) but the pulsating oil jet on 5902 was both unexpected and bewildering in its regular roar, woof, roar. The sight of the flames that emerged from the sides and beneath the locomotive could only be described as if they were from the legendary 'Tongues of Dragons' and the regular extinguishing and re-ignition of the burner must be the result of an ingenious device, the subject of much research and no doubt, shrouded in secrecy."*

Good to see John Lyons's new Z19 class No.1915 on the track. This is a very nice loco and believed to be the first live steam model of a 19 class built. There is a static model in the Powerhouse Museum.

Sydney Live Steam Locomotive Society
***Location**: Anthony Road, West Ryde*
***Public Running**: 3rd Saturday (pm)*
www.pnc.com.au/~wallison/slsls.htm

Whangarei, NZ

It was a beautiful day and the public were out enjoying the sunshine: a steady stream of customers making their way to the track. A total of 84 tickets were sold by the end of the day and it appears that at least some of these visitors are aware that we now regularly on the third Sunday of the month and not just on Live Museum days. The Club now has the full plans and engineer's calculations for the Clubhouse/ Station/ Workshop/ Storage building. The next step is to apply for the Resource & Building Permit which will be done in the next few weeks.

Whangarei Model Engineering Club
***Location**: Heritage Park, Maunu*
***Public Running**: 3rd Sunday & every live museum day*

Wollongong, NSW

At the July AGM the only change in office was that Bob Robertson replaced retiring President Ross Edmondson.

The 9th Annual Hot Pot Run was held over the Queens Birthday weekend and once again a resounding success albeit down on numbers this year, but those who did attend made the most of it and with trouble free running, there were numerous goods trains running in all directions. On-site campers were spoilt this year with our new facility, a hot shower and from all reports we came up smelling of roses with a "thumbs up" all round.

Over the weekend there were 48 locomotives registered with the usual abundance of goods wagons in tow, one of these years we must get someone to count them! As usual, the "hot pot" got a good workout and it's pleasing to report that the left over soup, 109 cans, was donated to the Salvation Army, a worthy cause. Next year marks our 10th Annual run of this event

According to Sydney Water the project is finished and the only thing they have agreed to do with our car park is to "roll" the eastern side when it dries out.

The bush management team are making headway with the removal of undergrowth and replanting native trees up near the 'swamp' and it's starting to look good. At the other end of the paddock Helmut has been busy transplanting the concrete core samples from the inner car park to along the creek from the car park to just behind South Box. Meanwhile the track gang look like branching out again with another loop around the outside, starting at North Box up around the bridge and along the creek linking up with the main line in front of the dunny.

Illawarra Live Steamers Co-op Ltd
***Location**: Stuart Park, Virginia St, North Wollongong*
***Public Running**: 4th Sunday*
www16.brinkster.com/ils2500

Farewell to our friends

We were sad to learn of the deaths of these model engineers:

Barry Bailey (LMLSLS, Edgeworth)
Morse Graham (LMLSLS, Edgeworth)
Harry Holland (HVMES, Petone)
Ted Carter (Tauranga MMEC)

We share the sadness felt by their families and friends, and offer our sincere sympathies. We also remember the many great times we've enjoyed together in our wonderful hobby.

Coming Events

15 to 16 November 2003
WDLS Annual 13 class Invitation Weekend

The Western District Live Steamers Co-op Ltd will be hosting our Annual "13 Class" event at our club grounds, which are situated in the grounds of the Fairfield City Showground, Smithfield Road, Fairfield, located on the western side (adjacent to Moonlight Rd). An invitation is extended to all to participate in our Annual 13 Class run including Steam, Diesel and Electric Locomotives. Air and 12v is available. We have elevated 2½, 3½ and 5 inch as well as Ground level 5 and 7¼ inch track. Plenty of parking is available. A Hot meal will be available on the Saturday evening at a nominal cost. Please confirm to help with catering. Saturday night running will be permitted. For further information contact the secretary Ken Pascoe (02) 9772 2336 or Shawki Slemon on (02) 4736 3035. Mail to WDLS, PO Box 403, Mt Pritchard NSW 2170.

8 to 12 January 2004
Steam & Steel 2004 — Hamilton NZ

The Hamilton Model Engineers are hosting the next New Zealand Convention. Full details appeared on page 51 in the last issue. For more information about this great event contact Valerie Clarke at 51 Alderson Road, Hamilton New Zealand. Ph. 64 7 8551 927, Fax 64 7 8551 307 or email bandv.clark@xtra.co.nz

13 to 14 March
Anniversary Run — Bulla, Vic

Tullamarine Live Steam Society will be hosting an inter club run to celebrate the anniversary of our official opening, the opening of our new Station, our new 3½" 5" ground track and our magnificent bridge connecting to our BBQ area. Being the second weekend of the month it is not one of our public run days so all members and guests will have everything to themselves. Further details to follow.

9 to 12 April
48th AALS Convention — Bunbury WA

See below

AALS 48th Annual Convention

Hosted by the South West Model Engineers Assoc (WA)

Forrest Park, Blair Street, Bunbury, Western Australia

9 — 12 April, 2004

- **Bunbury** is 180k south of Perth and is the largest regional city in WA. There are morning and afternoon train and bus services from Perth daily.
- **Track** — 1.2k of dual 7¼" and 5" ground level plus 100m elevated 3½"/5". A 300m extension to the ground level is currently under way and this will include a fly-over the existing track. Track all to AALS standards.
- **Safety** — max. speed 8 kph and 20 metres to be kept between trains at this speed.
- **Night running** — white light at front, red at rerar, no whistles
- **Road vehicles** — traction engines, etc. may operate on grassed areas in the park.
- **Boiler certificate** — either AALS or State Authority certificates must be presented.
- **Requisites** — Coal, char and oil provided, supply own petrol. Rainwater available.
- **Steaming bays** — 240 volt, comp. air, unloading ramp, workshop facilities, toilets.

Registration forms will be mailed out shortly.

Convention Secretary — Ian Morrison, 10 Clifton Street, Bunbury WA 6230
Phone (08) 9721 2034 for further details

Metrology

The Physics of Measurement — Part 2

by Dennis Collings

Vernier Height Gauges — Hardened or stainless steel base, and beam. Base to be flat, and square to beam within .003 per foot. The slider shall be a good sliding fit along the full length of the beam. Should be fitted with a fine adjustment, and locking screw. The graduations on beam, and vernier should be clearly engraved.

Sine bar, Sine table, Sine centres (figure 7) — Cast iron or steel hardened and ground all over. When the rollers are sitting on the datum pads for sine table or centres, and the surface plate for the sine bar, the centre line of both rollers should be parallel to the top surface in the case of sine bar, sine table, and centre line sine centres. The vertical centre lines through the rollers should be an accurate 5 or 10 inches apart to use the printed sine tables (*Machinery's Handbook*). I used the ten inch sine table to check the clinometers for the artillery test range to test guns, and ammunition. Methods of using slips, rollers, and balls to obtain measurement. **(figure 8)**

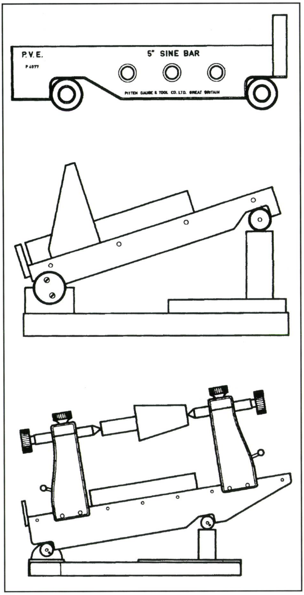


Figure 7

Measuring Wires for Threads and Gears. (*Machinery's Hand Book* or *Van Keuren Handbook* no 36/2.). To be used with Optical Scale Horizontal Measuring Machine, Bench Micrometer, and Micrometers. **(figure 9)**

Optical Dividing Head (Carl Zeiss Jena Germany.) **(figure 10)** — Precision instrument for checking and measuring angular divisions. In the inspection department, it is used to check protractors, cam plates, Camshafts, and the inspection of finished components for indexing errors. The worm gear only drives the dividing head spindle, thus revolving the graduated glass circular scale. Does not affect the indexing accuracy, not subject to wear on the worm and wheel as with mechanical dividing heads. also there is no worry of a ratio of 40-1 or 60-1 (see figure). The angular settings are read off in degrees, minutes, and seconds. (scales reading to 1 degree / 2 minutes / 10 seconds, range 0-360 degrees; microscope magnification 50x). The illustration (**figure 10**) shows a reading of 41 degrees 30 minutes 31 seconds.

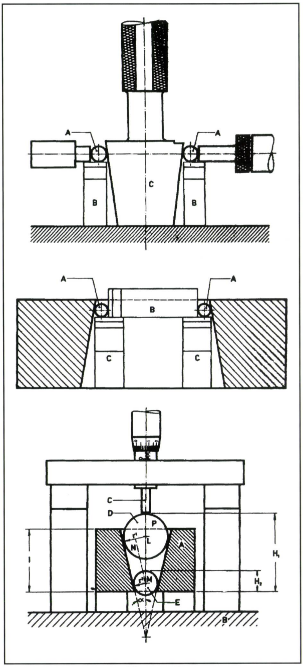


Figure 8

Circular Rotary Table (figure 11) — For inspecting components too large to fit on the measuring microscope rotary table. The table rotates through 360 degrees and readings are taken from a direct reading vernier to 5 seconds or, in the case of the optical circular table, from an optical scale to 1 second. The table is rotated by worm and wheel.

Clinometer (figure 11A) This instrument is used to measure and set inclinations and angles on plane and cylindrical surfaces.

Universal Measuring Microscope (Carl Zeiss Jena Germany) — Imperial model **(figures 12 and 20)**

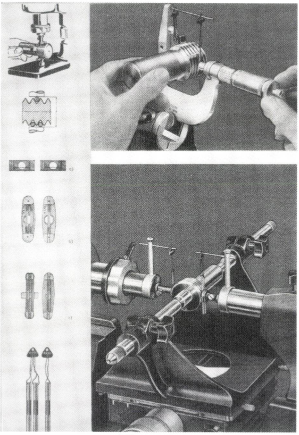


Figure 9

Spiral Microscopes (**Figure 13**) will read the X and Y co-ordinate (Longitudinal and Transverse travel) glass scales to +/-0.00005". This microscope is the standard instrument on which parameters of a plug screw gauge. can be measured directly without checking the test piece. The accuracy of measurement meets the requirements of Din 13 (German Standard) +/-.00005 inch. (**Figure 14**) Two different principles of measurement may be employed at will, the axial section, and the silhouette methods. In the first method a measuring knife edge makes contact with the thread at its axial section so that the thread profile is inspected directly. The

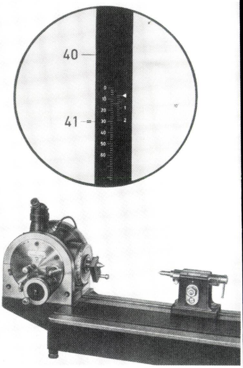


Figure 10

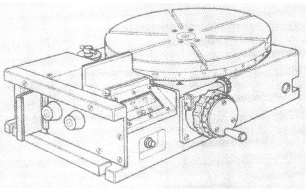


Figure 11

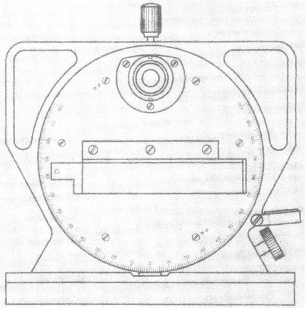


Figure 11A

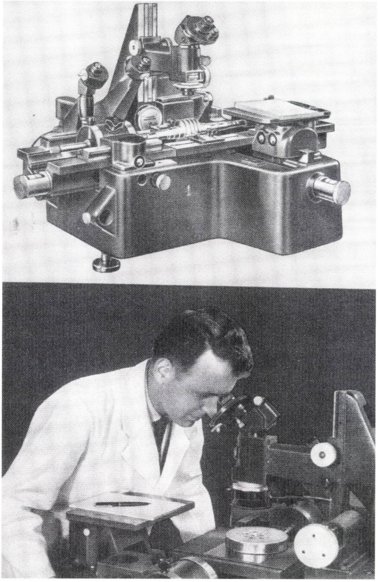


Figure 12

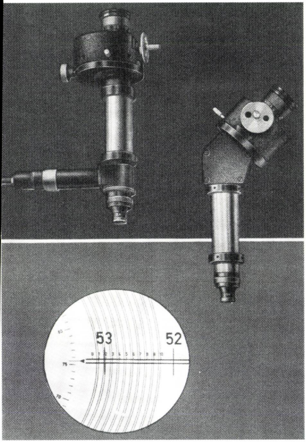


Figure 13

knife edges have an engraved line 0.1" or 0.2" from the contact edge. This allows you to take a reading away from the reflections of light from the ground thread flanks, subtracting 0.2 or 0.4 of an inch from your measurement.

The Goniometer Ocular (figure 15) is used mainly for

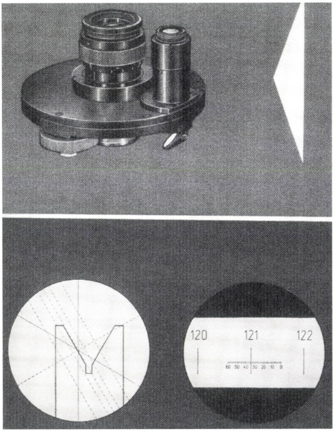


Figure 15

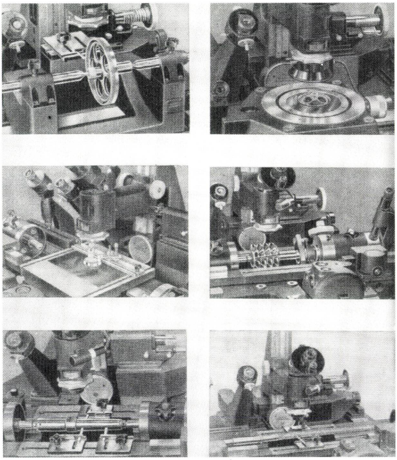


Figure 14

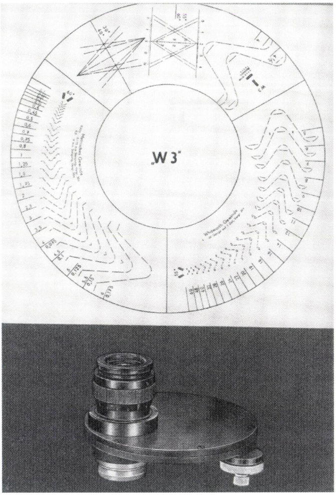


Figure 16

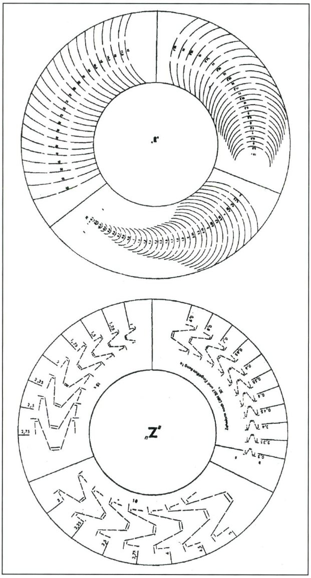


Figure 17

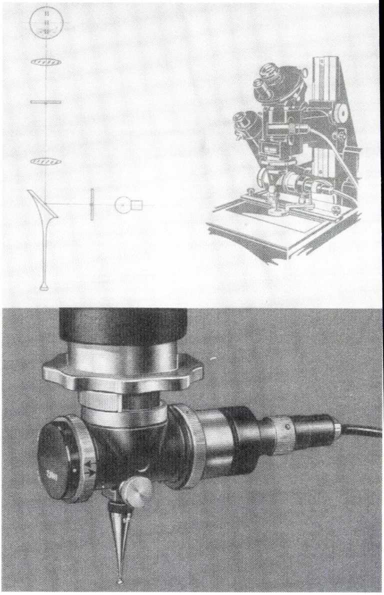


Figure 19

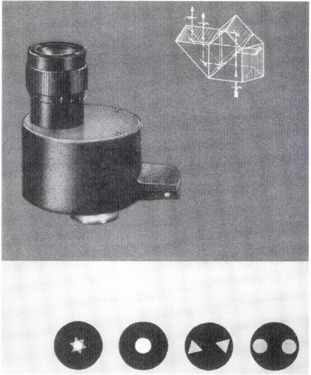


Figure 18

measuring threads, tapers, etc. by the axial section method. The eyepiece housing contains a rotatable template showing a cross-hair. The template is rotated 0-360 degrees by an outside knurled knob. The angular scale is illuminated by a special illuminator attached to the microscope tube. The silhouette method form of profile is compared with that of standard profiles. A number of **Dial Template Oculars** are use for checking the shapes of profiles by comparing them with standard templates ruled on glass plates (**figures 16 and 17**) **Thread, Gear, and Radii**. Double Image Ocular (**figure 18**) is used to set sighting and observation microscopes to the centre of holes, by combining the double image of the hole into one.

Optical Contactor Lever (**figure 19**) — At the start of a measurement, the surface of the test piece is placed in contact with the contactor ball by moving the measuring slides until the double index mark symmetrically brackets the vertical line of the eyepiece crosshair. After the position of the measurement slide has been read, reverse spring pressure. Move contactor ball until touching the opposite surface of the test piece in the same manner. This new position of the measuring slide is read. The difference between the two readings is the measurement minus one ball diameter.

To be concluded ...

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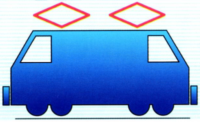


Ammeters and Voltmeters

For model battery electric locos

by Ted Barnes (New Zealand)

I have been building a new battery powered 7$^{1}/_{4}$" gauge loco, and it came time to think about circuitry and what instruments, if any, to install. It is perfectly feasible not to have any instruments, and drive by the seat of the pants as it were. When the thing stops, charge the battery! However, I would recommend at least a voltmeter. This can give you good insight as to the state of charge, and I think an ammeter in the battery lead can be useful as well, but less important.

Voltmeters

The first choice to be made is analogue or digital. I prefer analogue because you can watch it out of the corner of your eye and get a feel for what is happening without concentrating on the numbers. Either way you need to be able to read to 1 volt or less, easily. With a digital LCD panel meter, no problem. (Don't use LED displays, you can't see them in the sunlight). All you need are suitable scaling resistors.

With analogue meters there are two choices — a moving coil meter, or the sort you see used in automotive situations. Either way you should have an expanded scale, as all the important action will be around the nominal battery voltage. So in a 24V system have the scale go from 20 to 28 or 30 volts. I have used expanded scale 12V automotive meters in a 24V system by adding a 12V 1 watt Zener diode such as a 1N4742 in series. Thus the original 8 to 16 volt scale now reads 20 to 28 volts. This style of meter is a bit suspect from the calibration point of view, but is useful even if the scale markings are few and far between. You can buy 20 to 30V marine style voltmeters but they are a scary price. A 20 to 30V range meter can be made using a normal 100uA moving coil meter such as Dick Smith Q2047. Simply put a 20 volt Zener (or some in series to make up to 20 volts), a 96.7K resistor, (made up of two 47K resistors and a 2K7 resistor so the total including the meter internal resistance makes 100K), in series with the 100uA meter.

With 10 volts spread out like this the graduations will be 0.2 volts, good enough to see the voltage drop in the meter as the load goes on. If it stays about 22 volts at rest, it probably is time for a charge! And how much running you get from charging to 22V at rest probably tells you something useful about the battery capacity.

Ammeters

As above, there is the analogue or digital option. Digital ammeters can be particularly difficult to read on a locomotive because of rapidly changing numbers unless you reduce the sampling rate a lot; then you miss the interesting stuff. With digital, the main issue is making the shunt. More about shunts shortly.

With analogue the choice is automotive style, moving coil or moving iron meters. To be useful I think you need to be able to read in 2 Amp increments or better, and an accuracy of better than 5%. The full scale defection should be the maximum your controller will support. This may well be 100A so cheap automotive meters are not suitable, if only because they normally don't have scale graduations fine enough. This is for a good reason — they are usually very inaccurate, and generally read with different sensitivity for each current direction. A 10A moving coil meter such as Dick Smith Q2033 if rescaled to 100A with a shunt would have graduations at 2 amp steps. A disadvantage with this approach is when the motor(s) are regenerating, the meter will attempt to deflect off scale below 0. This will not hurt the meter (they normally stand 300% overload either way OK) but you don't get to see the regeneration current. As this occurs only briefly when braking it may not be of too much concern. The sort of meter I prefer is the moving iron style. They will read current in either direction and are inherently low internal resistance. They consist of a few turns of heavy gauge wire, in the middle of which are two pieces of mu metal. One is fixed and the other can move against a spring return, and carries the pointer. Current flowing in the coil creates a magnetic field that causes the two bits of mu metal to repel each other, hence the current reading. Moving iron meters often have 'M.I.' printed on the scale. If you can't see inside and see a big fat coil of about 3 turns, a clue is the scale which will be compressed at the low current end, and maybe at the high current end as well. They work equally well on AC or DC, but may be labeled AC Amps without admitting to working on DC. You have to look in junk heaps for these things. Old power switchboards could be a likely prospect. I have one made by Crompton from such a source, that is calibrated from 5 to 35A in 1 amp steps, with the range from 30 to 180A compressed at the top. All the rest I have attempt to make the scale as linear as possible.

Whatever you do, you probably will want to make a shunt to divert most of the current around the meter. To make a 10A FSD meter read 100A FSD only 10% of the current should flow through the meter. We will need a resistance of 0.00088 ohms for the shunt if the internal resistance of the meter is 0.008 ohms (the resistance of the Q2033 meter). This can be made from a strip of galvanized iron roof flashing. Arrange 10A to flow through the meter, then try bits of flashing across the meter terminals until the current is reduced to 1 amp. A piece 300mm x 20mm has been found suitable for the Q2033 meter. Make it in a 4 terminal form; that is a hole at each end to bolt on the main conductors, and a hole at each end for the wires to go to the meter. Don't shorten the meter leads after making the shunt! The same approach can be used when making shunts for any sort of ammeter. It is a good idea to re-scale at a simple multiple like 10 so the calibrations are easily read, and if you change the numbers on the dial plate you don't have to worry about the fiddly scale marks.

A digital panel meter is set up as a high input impedance voltmeter that draws negligible current, and will normally be 199mV FSD, so it is convenient to make a drop of 100mV in a shunt resistor equal to 100A. Such a resistor needs to be 0.001 ohm. Wasting a 1/10th of a volt in the measuring circuit in a 24 volt system is not too much of a penalty. It is possible to arrange part of the wiring of the main circuit as the shunt resistor by judicious choice of gauge and length, but I prefer to keep things separate, and use really heavy gauge short run conductors for the main wiring circuit.

You may think it a good idea to have an ammeter in series with each motor in a multi motor locomotive. The only thing that will show you is that each motor is actually drawing current. The amp reading is essentially meaningless as it will vary in a non-intuitive way. Consider the case of a locomotive with one motor and a 24V system. You are trundling along at low throttle and there is 12V across the motor terminals. The ammeter between the battery and the controller shows 10A say. Now assume the controller is 100% efficient (a good approximation; they don't need big heat sinks!). Therefore an ammeter in series with the motor must read 20A for power-in to equal power-out. If the motor currents are unequal in a multi motor setup, due to say a brush failure, it should be obvious from other clues like smoke and terrible noises!

As an aside I think that you should use one controller of adequate current rating irrespective of the number of motors used, because this avoids issues of equalizing motor drive voltages from multiple controllers. The arrangement I like is one 1kW (24V 40A) motor per bogie, so a B-B or C-C locomotive has two motors and one 90 amp max. controller.

In use I find the ammeter only gets looked at when the loco seems to be struggling, or you have changed something like adding more ride cars and you want to guess how many hours (or minutes!) you might have left in the batteries. However, it can be used to measure the overall efficiency of the system by recording the energy used to climb a grade.

First you need to work out the change in potential energy. Get on a length of track, say 50m long with a steep and constant grade. You need to know the total weight of the train (in kg) and height climbed (in metres). The product of mgh is the change in potential energy (in joules), where **g** is a constant, 9.8.

Now the energy used by the train (in joules) to travel up this grade at a constant speed is the product of voltage measured across the motor terminals, the battery current, and the time taken to climb the grade.

In the test I did on my locomotive:

Change in potential energy = mgh = 335 x 9.8 x 1.55 = 5088 joules

Energy consumed = Vlt = 12 x 24 x 35 = 10080 joules

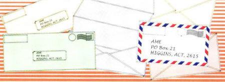
Therefore efficiency = 5088/10080 x 100 = 50.5%

This seems to be a plausible figur given the motors are about 67% efficie at this current level (from the motor spec sheet), making the efficiency of the gearin and wheels about 75%.

These calculations are rather rough but I think interesting to do. I've bee told that the chain drives can get ver inefficient when they wear. I have not go around to changing mine to see if this is factor in the above calculation. Anothe factor in my case was that the test piece o track involved some curves that might hav increased the wheel friction considerably.

Reproduced from the Blast Pipe, *th newsletter of the Hutt Valley MES and th Maidstone MES.*

Letter Box



Edwin's back-to-back

Sir,

Like many others, I have been following the *EDWIN* series quite closely, with a view to building a version even more 'British' in outline. I will not know if my proposals will work until we get to the boiler and footplate details, but I can wait, I have to find working space in my shed first!

I was slightly disappointed to note that the wheel details in the second instalment omitted the all important back-to-back dimension, the track gauge being of only limited value, especially if one wishes to operate on someone else's layout. I think this design will generate a group culture similar to that enjoyed at *Blowfly* rallies.

I then set out to provide this missing detail, but to no avail. The only reference immediately to hand was Martin Evans' *Model Locomotive Construction*, wherein he provides wheel profile dimensions for both '0' Gauge and '1' Gauge (both Coarse scale), which are very similar to Brian Wilson's. The major difference being 10° taper on both the front and rear of the flanges.

However, Martin also omits quoting back-to-back settings, which are pretty important where pointwork is to be traversed. My own recollection is that the dimension for '0' Gauge Coarse is 27mm, suggesting the equivalent in '1' Gauge would be 40mm. Are there any readers out there, more familiar with the appropriate standards?

Henry Pattenden
South Australia

Parting off — another idea

Sir,

I have a small 4" Chinese made lathe which I bought new about 4 years ago, and like a lot of small lathe operators, I had no end of trouble parting off. Let me assure you, I observed all the parting off requirements specified by the experts in the hobby engineering world, including removing as much slack as possible in the slides and feed screw. I shaped the blade according to *The Hobby Engineers Handbook* recommended angles for parting off BMS, but despite all efforts I couldn't even part off a piece of 12mm BMS without jamming the blade in the job.

Finally, I decided that I had to eliminate the main causes of blades jamming — excessive load, lack of rigidity, insufficient clearance angles and chips jamming the groove. To do this I decided to mount a 1/16" parting off blade in a one-piece back tool post. The blade was made with substantial side clearance angles extending back 3/16" behind the cutting edge. This would eliminate the first three problems. I used the front tool post, a 3/32" blade shaped as per the sketch; this blade opened out the 1/16" groove and so provided plenty of clearance for the chips. Parting off proceeds by making alternate cuts approximately 1/8" deep.

Despite this effort jams still occurred with both blades. I began to suspect that Tubal Cain's recommended back rake angle of 15° was drawing the blade into the job, causing it to jam, so I tried Ian Bradley's recommended angle of 5° to 10°. 10° also jammed. At 6° the following resul occurred.

Feeding the blade in produced a feather light and delicate feel to the cross slide hand wheel. After a while the blade would start to growl as it bit deeper into the job. When this happened I would stop in-feed. However, the blade would continue to growl as it gathered up any available slack in the slides and feed screw. If I continued to in-feed at this point the blade would immediately jam.

I believe this proved that back rake angle was the main cause of blades jamming in my lathe, so I decided to find an angle which did not allow this to happen. If you think about it, any negative rake angle would have a tendency to push the blade off the job and any positive rake angle would have a tendency to pull the blade into the job, a neutral angle would have to be 0° or no rake at all. To check this assumption I tried parting off a piece of ¾" BMS with blades shaped up for parting off brass, with 0° back rake. The blades were mounted as before with the 1/16" blade in the back tool post and the 3/32" blade in the front tool post. It worked fine. The feel on the hand wheel was firm and positive. I decided to apply the acid test. I tried parting off a piece of 2" dia. BMS. Bingo! It parted off with no jams.

Letterbox Contributions

You are welcome to send letters by **mail** to:

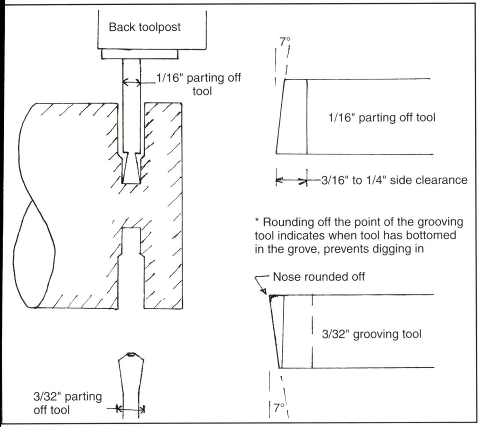
PO Box 21, Higgins, ACT, 2615 or

fax to: (02) 6254 1641 or

e-mail to: ame@netspeed.com.au

As far as possible, *AME* is an open forum for all members of our hobby. Therefore, all expressions of fact or opinion as long as they are not libellous will be considered for publication.

Please type or clearly print your letters, as script is often difficult to interpret. Due to popularity of *Letter Box* and limited space, letters of 400 words or less will have a better chance of being published.


Back toolpost
1/16" parting off tool
7°
1/16" parting off tool
3/16" to 1/4" side clearance
* Rounding off the point of the grooving tool indicates when tool has bottomed in the grove, prevents digging in
Nose rounded off
3/32" grooving tool
7°
3/32" parting off tool

Testing various blades produced the following result. 3/32" blades with 0° back rake, cutting full width on large diameters, chatter, but will cut if the blade is sharp and is driven in hard. 1/16" blades with 0° back rake do not chatter even on 2" dia BMS, I have decided to use 1/16" blades ground in the conventional way but with no back rake to part off small diameters of less than 15mm. Obviously there is a limit to how deep you can cut with a 1/16" blade, so on larger diameters I use the two blade system. It is trouble free and works well on larger diameters, although it does take longer to part off compared to using a single blade.

Small lathe operators with back gear on their machines may get a better result with 3/32" blades and could perhaps handle a little back rake (1 or 2 degrees) but I feel sure the back rake angles quoted by the experts apply more to large commercial lathes than to small hobby lathes of 4" and less. They certainly do not apply to my lathe.

Incidentally the blades shown in the sketch cannot be shaped up on a bench grinder. I used a Dremel® grinding wheel to rough cut the blades and then finished the job with coarse grit diamond needle files and Ezelap® fine grit files. This work is best done under a 2x workbench magnifier with a built in light. Most of the articles printed about parting off indicate to me that possibly a lot of small lathe operators could be having blade jams caused by back rake angles. If so try no back rake — you have nothing to lose.

T A Brown

South Australia

It's in the name

Sir,

I refer to the letter from Bob Sampson on the National Railway Museum in Issue 110.

Bob is to be commended for his positive attitude and excellent reasoning in his defense of the indefensible. I find the term 'National' to be in the same league as those "Premier State" number plates in NSW; just mildly objectionable. Its biggest disadvantage is that it detracts from Port Dock being what it really is — an excellent museum of South Australian railway history.

Warwick Allison

New South Wales

Wheels and rails

Sir,

With reference to Henry Pattenden's article on the interaction of wheels and rails he dealt only with the function of the root radius of the wheel against the head radius of the rail. In best practice the rail head is inclined at the same angle, 1 in 20, as the wheel face angle and thus on straight track the radii of the two components, wheel and rail head, should not touch one another. It can be demonstrated the wheel set self-centres on tangent track without flange contact. The modern self steering wheel set uses the self centering effect of the coning to steer the wheel sets in a bogie around a curve with no use of the flanges to steer. This complicates the analysis and calls into question the amount of interaction between the two radii.

When travelling around a curve the amount of contact between the wheel radius and the rail head radius must depend on the radius of the curve and the speed of the vehicle as well as the axle centre distances, i.e. the force required to steer the vehicle around the curve.

In the days of large steam locomotives their long fixed driving wheel base caused many problems on tight curves despite having flangeless drivers to ease the problem. In modern North American practice the wheel loadings have reached such levels that the rail head is being rolled on both tangent and curved track. This rolling is clearly visible and must destroy any theoretical relationship between the rail head and wheel.

From many years observation it seems most model rail vehicles will run on most model rail track. The worst wear is caused by the vehicles that the driver and passengers sit on because the rail and wheel loadings are very high.

With regard to Robert Elliston's concerns about damaging his loco by running on track that does not comply with the AALS standards he is right to be cautious but, in the writer's experience, many close scale, gold medal winning locos have run quite happily on black iron rail with no apparent ill effects. They usually didn't pull much but then they were built to be pretty not for heavy duty passenger haulage.

Dave Taylor

BC, Canada

(This letter borders on a topic which I closed in the last issue, but because it deals with some different matters it is included. This does not mean the previous discussion is re-opened ... Ed.)

Plastic Sleepers

In the last issue of *News Desk* information was requested on suppliers for plastic sleeper material. From the responses received we can offer the following supplier details:

Advance Plastic Recycling
Lot 9, Churchill Road,
Kilburn SA 5084
Phone: (08) 8359 4999
Fax: (08) 8359 4988
Mobile: 0416 101 400
(Advised by Morphett Vale Railway)

Repeat Plastics Australia Pty Ltd
50 Elsworth Street,
Ballarat Vic 3350
Phone: (03) 5333 2883
email: info@replas.com.au
Internet: http://www.repeat.net.au/
They are also in Melbourne at Lillydale
(Advised by Ballarat SME that they have found them to be very suitable and that the company is happy to supply clubs around Australia. Price is by negotiation.)

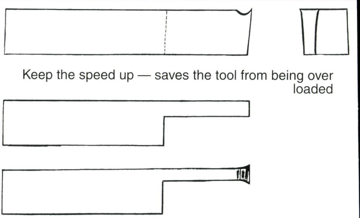
Emails not being delivered ... ?
AME has a new email address —
ame@netspeed.com.au

Some Notes on Parting Tools

By Ted Murrell

Here are a few points that might help in the ongoing parting tool debate.

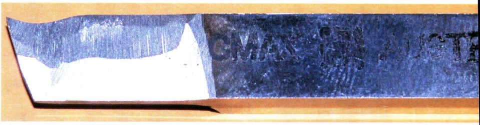
Always remove the tool from the cut before stopping the lathe and use plenty of soluble oil cutting fluid. A big problem with parting tools is the swarf — it must have a smooth flow out, any little grinding mark can cause trouble. The profile of the tool is important here and the **sketch** (right) and the **two photos** may show you better what I mean.

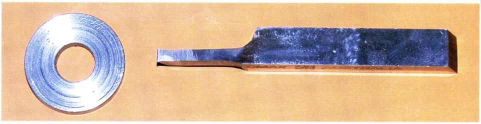


Keep the speed up — saves the tool from being over loaded

Some years back I got a job at Ruwolts of Burnley. At the time I thought they must be desperate as I was not up to their standard, but I improved quickly with the assistance of the real tradesmen (they were good chaps). I followed their lead in the grinding of the tools which was a big help. The tool steel they used was all 1' x ¾" (25 x 19mm) and the blacksmith was there to forge to the shape required. The tool is most important as with the success of any the job it is rated at 70%, the lathe at 20% and the man at 10%.

One job they gave me was a plate 250mm dia x 30mm thick. 22mm had to be removed from one side, leaving a spigot in the center 65mm dia. I needed a top for a gas producer so I got the smith to forge a parting tool with a blade 100mm long. With that I parted down to the spigot then in from the front, which gave the plate I wanted.



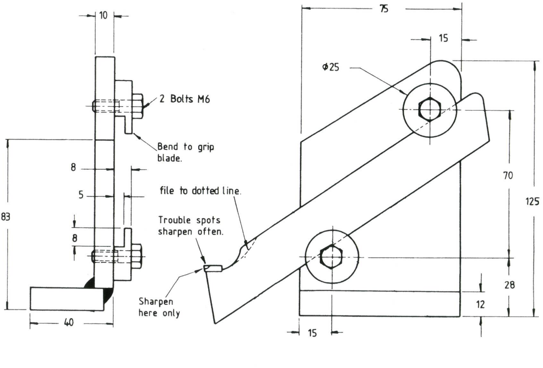


Some people angle the end of the tool to eliminate the pip from the parted off piece but I have never been happy with that idea. If the tool goes crunch check for something that might cause the swarf to build up.

I have a tipped parting tool (**see drawing**, below right) in a simple holder with which I have parted steel 6" dia (150mm) on a heavy old lathe that is well worn. It is mounted on the front on the top slide, but positioned on the heavy centre part of the slide. To move the slide to the left can cause chatter, or even worse, perhaps dig in.

If a centre is required to support the job, maybe just to hold it in the chuck, note that the live centre can cause chatter. The solid center is best but you should lubricate it (same with taps and dies) or put a smear on the mandril to stop it picking up and for this I use gear oil (extreme pressure). I hope we are parting friends.

The drawing (right) originally appeared in AME issue 28, January 1990 as A Project for the Lathe.



TIPPED PARTING TOOL HOLDER.

Tracks ' n ' Trees

Get Something Up and Running

with David "Doc" Wescombe-Down

There is only one hard part about building a garden railway — picking up the crowbar or shovel for the first time! Everything after that is much easier.

If you have had indoor model trains or associated workshop activity, there are some similarities. Outdoor lines are neither dearer nor cheaper than indoor in the same scale/gauge. Your time and skills remain just as important. You will try to create atmosphere from a concept.

One difference of significance to yours truly, is that when we go outside we don't actually build a *model* railway there – we build a *small* railway instead. Why? The locality, trees, soil, flowers, birds and other creatures all around the track. It has rain, sun, snow, dust and wind, just like a full size railway, so that makes it very different. Strangely enough, in the outdoor layouts, most of what happens is related to the garden and the elements, not what size or shape your loco is, or how much it cost, or how long it took to build.

Let us assume you already have a garden, no matter what size, you have two basic railroad choices:

1. you control everything — build with weatherproof materials and define where your track will run.
2. work with nature — look at your garden and try to design a track run that can meander or wander around features you already have in the space available.

Whichever way you choose to go, it is generally accepted that constructing at ground level gets you underway quicker and cheaper but with more ongoing maintenance. An above-ground system is more initial work and expense but usually has less repetitive maintenance.

So, what height do you want? As "Father Time" erodes our bodies, crouching, stooping and kneeling for hours of tracklaying, ballasting and wiring may not be much fun. As stated, it is usually easier to get going on the ground, but be mindful of wear and tear from animals, lawnmowers, wheelbarrows, trailers, children, visitors, etc. High level track, whilst more complicated to establish, is a better display platform for your rolling stock and locomotives and makes them easier to operate. No matter how you go, please ensure your track is laid on a sound base — it is better to have a short line, properly laid, than an expansive one, poorly laid, which will bring you misery later by way of derailments, repairs and remodelling.

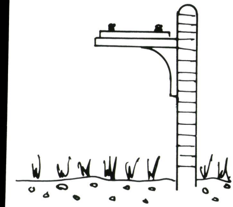
As with learning to play a musical instrument, the time spent in the beginning is the hardest and shows the least result — things improve dramatically later and you will be well-pleased with your efforts.

Anecdotally, we installed a treated timber, above-ground track bed about 12 months prior to final tracklaying, wiring and ballasting, in order that everything would have time and weather to stabilise. We used that time to build dioramas, trial various track constructions, customise and build locomotives and rolling stock, experiment with battery power and develop various scenic enhancements including the garden itself.

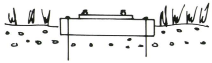
For a ground level track, you can get underway as easily as:

1. dig a 100mm deep trench about a spade's width and try for some slope for drainage
2. line the trench with weed mat
3. fill the trench with small gravel mixed with dolomite and tamp down firmly
4. lay the track on top of the gravel mix

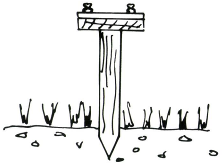
Some ideas for laying the foundations of your garden railway . . .



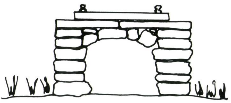
Attach a bracket to an existing wall or fence but make sure you use stiff girdering for a base between brackets.



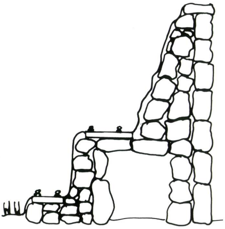
Peg old (seasoned) planks to the ground — not the best method but probably the quickest. Join the planks with strips along the edges



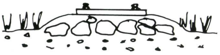
Posts in the ground with a timber deck is a popular method and relatively simple to construct. To achieve the best stability set the posts in concrete



Two stone walls can be used with the top bridged between them. The space between the walls can be filled or used for storage.



Making use of existing structures like embankments or rock walls — note tracks on two different levels.



Slightly raised above the ground on concrete. This method reduces maintenance and is more durable than directly on the ground.

and secure every metre or so with lightweight wire tent pegs hooked over sleeper ends

5. mix some cement powder and dolomite (1:4) for ballast and spread carefully with a dessertspoon and 30mm paintbrush. Ensure the ballast only reaches the sleeper tops and none is adjacent to the inside rail edges or in points
6. gently spray the whole track area with a fine mist and allow 24 hours to dry.

This will not necessarily provide you with a *permanent* railway, but it will get you going in the garden.

As an alternative to the tent pegs, you could cut hardwood blocks to which the track would be screwed (galvanised, brass or stainless steel) every 300mm or so, and the blocks set into the dolomite/gravel base. Once the blocks are correctly in place and the track is levelled to your requirements, ballast as above.

If you only have a small space in which to construct an outdoor railroad, give some thought to either:

1. building a low brick/stone wall, one brick wide, or
2. pouring a similar low base wall of concrete

upon which to mount your track work. Get going with a simple oval, with or without sidings or "kinks" for interest, a station, and/or perhaps some type of bridge over a man-made valley.

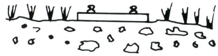
If you are going to use concrete for a gauge O/1 track base, dig a trench about 100mm deep and 150-200mm wide. Find some old plywood or Masonite which you then cut into strips (as wide as you want your little wall to be high). Paint the inside surface of your strips with any kind of oil to allow easy release from the concrete, and peg the strips (about every 300mm or so) along both edges of your trench, ready to take the concrete mix. Check for level and slopes required then mix and pour your concrete. Tamp it into place firmly, finish with a wood float and edging tool, then keep it damp for a week to cure. Carefully remove the pegs and peel the edge boards away. Now you can take the rail sections and fix them down with a silicone sealant or however you prefer. For a more permanent intention, and if you want to use track power, solder a bridging wire across every rail joint so you are not relying solely on the standard rail joiners (although brass and nickel silver type should last for a long time).

I have seen tracks laid in ground mounted guttering, fibro-cement half pipes, on bricks, wood ash and gravel mix concrete strips, timber decking, timbe blocks and slate pads. As long as you base is solid enough, the track aligned an secured, you can use any of the method shown.

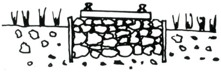
Whatever you do, go and visit othe enthusiasts to get new ideas, reassurance and camaraderie – you will soon have i confirmed that, unlike indoor modelling there is no requirement to produce hig levels of prototype accuracy out in you garden (unless you want that, of course).

That's it for this edition: get something up and running! (and tell us about it).

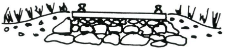
. . . and here are some more ideas



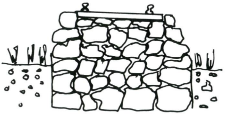
Track laid directly on the ground — the least satisfactory of all methods. Prone to the weather, grass and high maintenance.



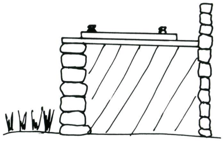
A wall of slate or other durable material separates the track from grass and plants. It is slightly above ground level with free- draining gravel underneath. Susceptible to damage from mowers, bikes, etc.



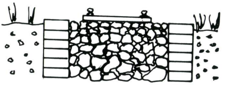
This method is similar to the previous one except that the lawn has been built up to the track level. Provided the track is securely set down with cement or similar it can be mown over without damage.



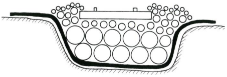
A low natural embankment is an ideal place for a railway. If planted with ground cover or small vegetation it blends into the garden and keeps everyone happy!



This method entails the building of a secondary wall adjacent to an existing wall or fence and bridging the gap across the top.

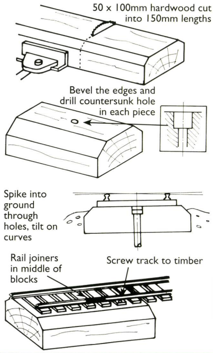


Another method of separating the track from surrounding grasses and other intrusive vegetation. In this example old bricks have been used. An advantage of this system is that weedkiller can be used without harming the lawn.



Unlike all the methods already shown, this one requires all the basework to be in a trench below ground level. The trench is dug and lined with heavy black plastic before the track bed is built up with gravel, larger at the base and smaller towards the top for stability and drainage. This methos is a better way of having the track at ground level.

Using a timber track base


50 x 100mm hardwood cut into 150mm lengths
Bevel the edges and drill countersunk hole in each piece
Spike into ground through holes, tilt on curves
Rail joiners in middle of blocks
Screw track to timber

More resources ...

- **Tootle Engineering** *(see next page)*
- **Stoomgroep Holland**
  Hon Sec. P van Mazjik
  107 Schutterspad
  6866 E V Heelsum
  Netherlands
  (Metric drawings of steam driven models and equipment for Gauge 1)
- **Lutz Hielscher Technische Spielwaren**
  Schmiedestr. 52
  42279 Wuppertal
  Germany
  www.hielscher-dampfmodelle.de
- **Sulphur Springs Steam Models**
  www.sssmodels.com
  (tools, fasteners, locos and engineering drawings for locos, mostly UK outline)

Product Reviews

The Moreton Cane Truck

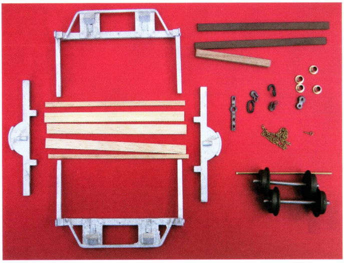
A new wagon kit for your garden railway

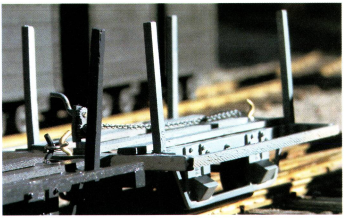
Tootle Engineering in Canberra is a more recent supplier to the garden railway locomotive and rolling stock scene, but if their latest offering is any indication, they are about to become more widely known. They have just released a kit for one of those old Queensland whole stick sugar cane wagons, based on the style which ran at the Moreton Mill in Nambour, itself much the same as those used on all other sugar tramways.

The sample reviewed is for 32mm gauge but a 45mm gauge version should be out by the time you are reading this review. The accompanying photos show the wagon kit prior to assembly and the completed item on the track. The main structure is in white metal with the floor being of small timber planks. The wheels are blackened brass. As can be seen in the photo, all the small detail components needed to make a fine model are included. All items are finished to a high standard and fit together with minimal effort — the white metal castings are very clean and need little attention. Tools, glue and paint are not included — they being all that is required to complete the kit. Insulated wheelsets will be available shortly for electric layouts (extra $12.50 on price). I am told that also coming soon is a ready to tun Malcolm Moore locomotive.

Available from: **Tootle Engineering**, 217 Wheeler Cres, Wanniassa ACT 2903 Ph. (02)6231 7265 (AH) (02)6285 1855 (BH) Fax: (02)6285 1533

Price: $54.95 *(plus $8 P&P per order regardless of quantity)*



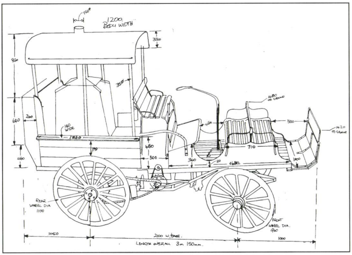


Traction Action

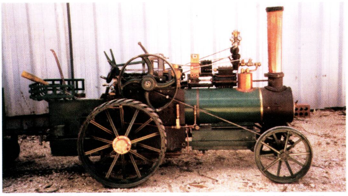
with David Proctor

A very short column this time; but with the Echuca Rally in the last issue and Ken Preiss' series, road steamies have not been totally deprived. Len Claridge in South Australia is researching the Shearer Steam Carriage (right) which was built in Mannum, SA in 1890 and is currently housed at the Birdwood Museum. He would appreciate any information you may have and eventually we may see an article on it in *AME*, eh, Len?

Finally a couple of photos of the Autumn run in Inverell from Jim Brydon. Next issue the Wauchope miniature TE rally.



The unique Shearer Steam Carriage



This Cliff & Bunting belongs to Bob Sutcliffe from Albany, WA

Wayne Anderson calls his C&B "Scrap Heap", his source of materials

Elmore Miniature Railway

by Max Wilson

A miniature railway is being constructed in the small town of Elmore, Victoria, approximately halfway between Bendigo and Echuca.

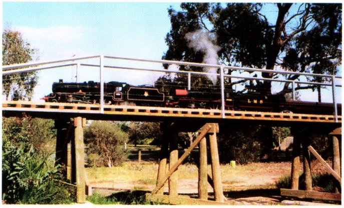
Thus far it is a well constructed, rural setting, railway with approximately 1 km of 7¼" gauge mainline already laid and four magnificent trestle bridges. Barry Mitchell, owner and operator is a man of many skills and talents, with the majority of work undertaken by himself

The mainline leaves a beautifully constructed station and ticket box on a journey over a stretched 'figure 8' design. After leaving the station the train winds through a well-maintained playground and picnic area and past the engine shed. Out in the rural area which runs by the main 5' 3" Echuca line for about 400 metres, the track passes under one of the large trestle bridges and into a passing loop, designed for bi-directional running. After the loop the train commences to return via another low trestle bridge and climbs about a 2 percentage grade. At the top of the grade is the trestle bridge which was previously passed under, and the train proceeds down grade to level running. A further two low trestle are crossed, a long straight run, a good stretch to highball, befor returning to the station.

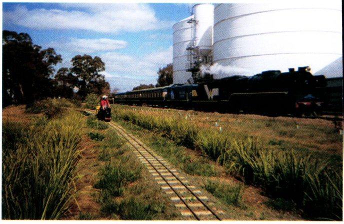
The motive power for the trains can vary from a beautifull crafted "Black 5' steamer, a freelance T class diesel, to a now completed and magnificent 280 hp Walker rail motor. The last two were constructed by Barry without drawings.

Bendigo Council helped Barry commence construction of the railway by donating labour, soil and plants for the earth works and beautification of the site. The majority of the work, as mentioned was and still is being done by Barry with occasional help from a couple of close friends.

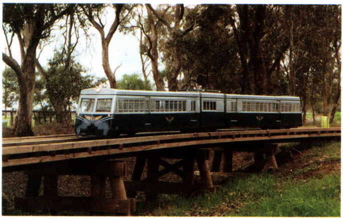
Those people who have already visited this near completed railway have all enjoyed it and I suggest that if you are in the area you may wish to visit. You will find Barry is only too willing to share his knowledge and hospitality at the "Emma" (E.M.R.).



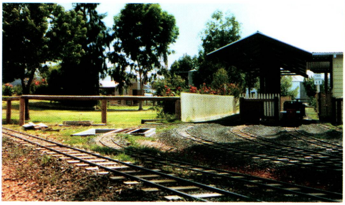
Two Black 5s crossing the high trestle



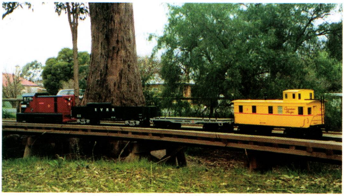
Black 5 versus VR 'R' class



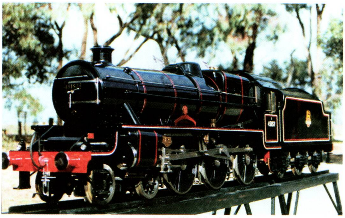
280 hp Walker VR railmotor crossing the low trestle



The station and park area



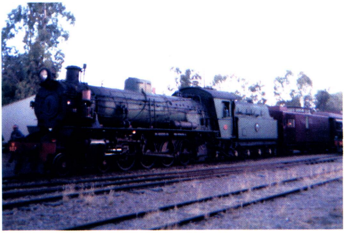
Freelance diesel and freight train



Barry Mitchell's Black 5

Easter at The Pichi Richi Pass

by Murray Hill



Ex WAGR W class 934 at Quorn

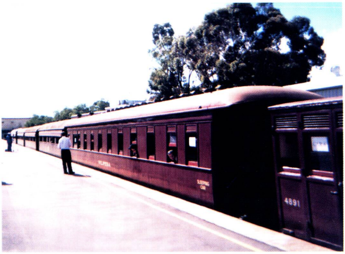
For me the highlight of the whole Easter experience in South Australia was the day-return trip from Quorn to Port Augusta rough the beautiful Pichi Richi Pass in the lower Flinders nges. When I planned the trip (see *AME* issue 107, page 51) e intention was to entice some of the 'eastern staters' to an event at they would seldom have the opportunity to experience, and t few availed themselves of the opportunity. Those who did go njoyed a wonderful experience.

Over the last two years the volunteers at Quorn have ompletely re-built an 'NM' class loco from the tyres up, which ould have been quite an achievement even by a full time railway orkshop. Although it was deemed to be completed and ready r the road, there was not enough time to carry out road trials, c. in time for this weekend. This resulted in myself getting volved in lighting-up at short notice, the stand by locomotive, x WAGR W934.

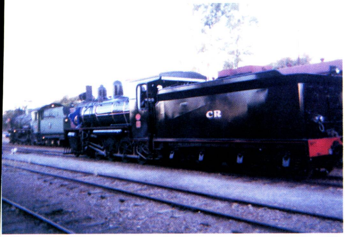
The original plan had been for the 'NM' to be placed at Port ugusta with a set of ex narrow gauge *Ghan* carriages on the aturday afternoon. The morning train from Quorn to Port Augusta as to be headed by ex SAR 'T' (the only one still in operable ervice) with a train of SAR carriages, some of the original ones om the East-West trains of 1917. The two trains were to combine r the return trip from Port Augusta as far as Woolshed Flat where arious dignitaries, MPs, etc. were to make speeches regarding e-consecration. The trains would then divide whereupon the m with its consist and dignitaries would return to Port Augusta r a banquet, the the common folk would continue to Quorn for "self-paid" banquet. All would have worked well until the Nm uffered a temporary failure a few hours beforehand.

Plan 'B', organized at 5 minutes notice, then came into play t midnight Friday. Yours truly got rapid promotion and was ispatched to light the fire in the dead 'W' to have it ready by 6: 0 am. The original plans had now gone out the window, and as the turntable was unserviceable the 'W' had to be turned on the triangle at Stirling North and steam tender first into Port Augusta. The 'T' meantime took over hauling the VIP train from Port Augusta to Quorn where the speeches were hurriedly delivered instead of at Port Augusta, while we were happily returning to Quorn on the W independently.

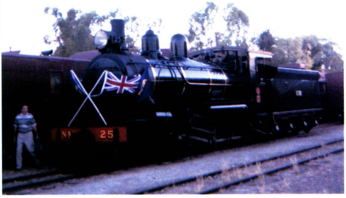
It was a magnificent trip, as are all trips through the Pichi Richi Pass, and a most enjoyable day was had by all, not to mention the party in the pub later on. The trip to and from Port Augusta was absolute "magic' the way the track winds around along the creek bed and sides amongst beautiful old red gums, with the 'W' blasting away up front with an almost full load.



Consist of ex narrow gauge Port Augusta to Alice Springs Ghan *stock*



Above and below: two views of newly restored NM 25 at Quorn



The highlight of the day was having 3 locos in steam. The 'NM', despite its teething troubles, was able to be steamed from the depot to the station yard and glided past, creating suitable atmosphere, whilst the speeches were being made in Quorn station yard. In the evening it was off to the "Transcontinental" pub where they did us proud and we had a wonderful evening together, enjoying each other's company exchanging life histories and telling a few lies and jokes. The pub is a bit of a story in its own right. It was built in 1875 in conjunction with the line opening, and served its purpose well over the years before going into eventual decline. Fortunately, some enterprising person saw its potential (it is a very large building) and resurrected it beautifully and it is now the most attractive of the town's four pubs. Quorn was a big railway center in its heyday, but now survives on its tourist potential, due to the beautiful scenery and being the gateway to the Flinders Ranges.

News Desk

with David Proctor

Very limited space means this column will be the shortest yet. From the feedback which has come in, the changes made in the last issue have been very well received. There were a few hiccups though, the main one being an incorrect photo in *Steam Chest* (page 23). The correct photo appears at the end of *Steam Chest* in this issue.

Price increase

It is with great reluctance, that due to increased distribution costs, it has been necessary to make some small increases to t price of *AME*. From 1 January, 2004 the price structure will be:

- **Australian** Subscription A**$40**
- **New Zealand** Subscription A**$50**
- **Other Countries** Subscription A**$60**

These prices are also shown in the subscription form on t next page and the Australian price includes GST. In addition it h been necessary to increase **the cover price to $7.00** (includi GST) in Australia and **NZ$9.95 (incl. GST) in New Zealand.**

It is not very often that the price of *AME* increases, and at the prices it is still very good value for money and remains cheap than most hobby magazines.

Plastic sleeper suppliers

See page 55 for the responses to the request for informati in the last issue.

Space is a bit tight this issue, so until next time, *have a hap and safe holiday!*

Dav

Classifieds

For sale — $7^{1}/_{4}$" gauge *Royal Scot*

- Just completed, Briggs boiler (John Dew), current certificate. Bill (02)6386 2013

For sale — magazines

- *Austr Model Eng*. No. 1 – 110 $450, *Eng in Min*. 23 year collection $700, USA *Projects in Metal* Vol. 1 to Vol 11 $600, USA *The Home Shop Machinist* 13 year collection $700. All above mint condition, cash sale. Ph. Henry (02)6247 7957

$7^{1}/_{4}$" gauge steam locomotive for sale

- Harold Clisby designed 0-6-0 *Ginger*, , current boiler certificate, 12V lighting incl. high/low beam headlight and scale marker lamps on brake van. Package includes two riding trucks, SAR style brake van and lots of spares. $15,000. Ph. Barry (08)8263 1766 Mob. 0427 803 159

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Bundaberg Fowler 5" gauge parts, frames, cylinders, wheels, rods, etc. $1200. Myford compound vertical slide $450 (02)9875 5410

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Australian Model Engineering magazines from March 1999, 25 issues, good condition. $60.00 the lot. (02)4753 6773

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Myford ML10 lathe c/w Dickson quick change tool post, tool holders, 3 & 4-jaw chucks, face plate & stand. Ph. (02)4271 6889

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Wanted — ***Light Steam Power*** magazine Vol. 3 to vol. 11. Ph. (03)5126 2202 after 7pm

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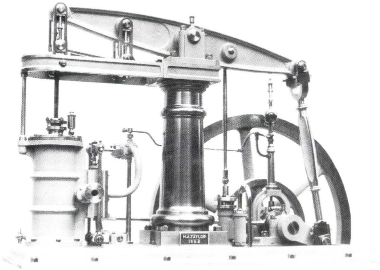

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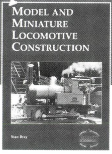
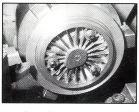
MODEL AND MINIATURE LOCOMOTIVE CONSTRUCTION

BY STAN BRAY

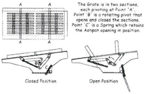


We are pleased to announce the publication of this new book by well known author and contributor to *Model Engineer* magazine, Stan Bray, on the construction of model and miniature locomotives from Gauge 1 to 7¼" gauge, with the accent on the passenger hauling gauges.

The bulk of the book is Stan passing on hints, tips, ideas and practices he has picked up over fifty years as a model engineer, and he covers the subject with chapters on each major part, such as frames, axleboxes, valve gear, cylinders, boiler, platework etc. He also covers electric and I.C. powered locomotives.



Each chapter is illustrated with drawings and photographs of the relevant parts of the locomotive, (the photographs covering boiler construction are in colour for extra clarity), and there are 7 pages of Appendices of useful charts. Throughout the book there are also photographs of model and miniature locomotives from around the world; this is the first *International* book on this subject, reflecting the Stan's pioneering of overseas visits, with models, from the early 1970s on, and his subsequent involvement with the rapid growth of the model engineering hobby in Europe and world wide.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The Grate is in two sections, each pivoting at Point 'A'. Point 'B' is a rotating pivot that opens and closes the sections. Point 'C' is a Spring which retains the Ashpan opening in position.
Closed Position
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Written in Stan's inimitable style, there are numerous asides, often humourous, so this book is a good read, as well as containing a huge amount of practical and useful information and ideas. Whilst especially useful for the beginner, this is a book any model or miniature locomotive builder should have on their bookshelves.

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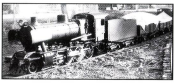

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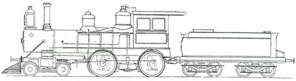

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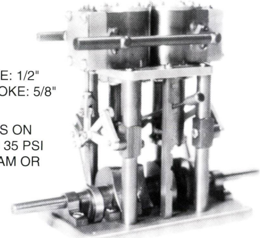

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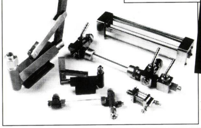

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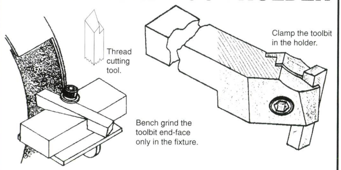
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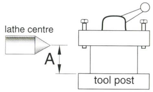

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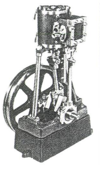

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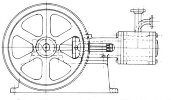

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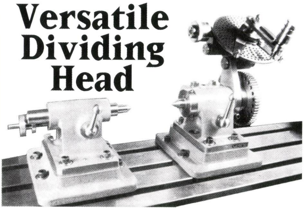

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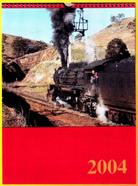

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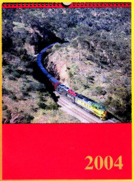

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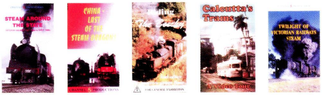
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